

# **STIC Search Report**

## **Biotech-Chem Library**

**STIC Database Tracking Number: 137682**

**TO: Deborah Lambkin**

**Location:**

**Art Unit: 1626**

**November 14, 2004**

**Case Serial Number: 10/649868**

**From: P. Sheppard**

**Location: Remsen Building**

**Phone: (571) 272-2529**

**sheppard@uspto.gov**

**Search Notes**

Access DB# 137682**SEARCH REQUEST FORM****Scientific and Technical Information Center**

Requester's Full Name: Deborah Lombardi Examiner #: 71700 Date: 11/4/04  
Art Unit: 1626 Phone Number 302-0698 Serial Number: 10649868  
Mail Box and Bldg/Room Location: REM5807 Results Format Preferred (circle): PAPER ~~DISK~~ E-MAIL

**If more than one search is submitted, please prioritize searches in order of need.**

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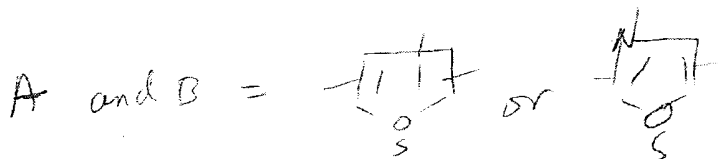
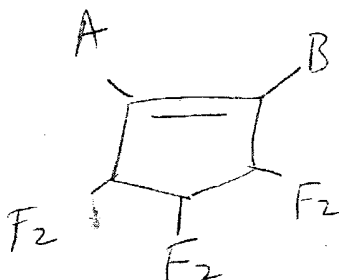
Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: Photochromic Material

Inventors (please provide full names): Fukuda et al

Earliest Priority Filing Date: \_\_\_\_\_

*\*For Sequence Searches Only\* Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.*



*see claim attached*

*Thanks DA*

\*\*\*\*\*  
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	Type of Search	Vendors and cost where applicable
Searcher: <u>Sheppard</u>	NA Sequence (#) _____	STN _____
Searcher Phone #: _____	AA Sequence (#) _____	Dialog _____
Searcher Location: _____	Structure (#) _____	Questel/Orbit _____
Date Searcher Picked Up: _____	Bibliographic _____	Dr. Link _____
Date Completed: <u>11/14/04</u>	Litigation _____	Lexis/Nexis _____
Searcher Prep & Review Time: _____	Fulltext _____	Sequence Systems _____
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Online Time: _____	Other _____	Other (specify) _____

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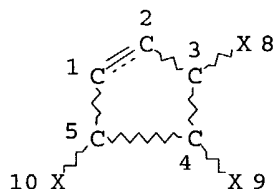
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FILE COVERS 1907 - 14 Nov 2004 VOL 141 ISS 21  
 FILE LAST UPDATED: 12 Nov 2004 (20041112/ED)

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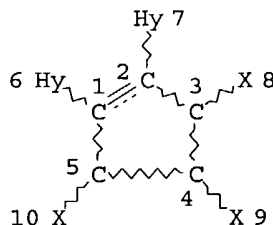
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 DEFAULT ECLEVEL IS LIMITED

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STEREO ATTRIBUTES: NONE  
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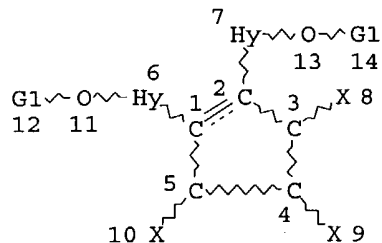


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GGCAT IS MCY AT 7  
 DEFAULT ECLEVEL IS LIMITED

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 NUMBER OF NODES IS 10

STEREO ATTRIBUTES: NONE  
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 L8 STR



VAR G1=ME/ET/I-PR/N-PR/I-BU/N-BU/T-BU/S-BU

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STEREO ATTRIBUTES: NONE  
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L10 ANSWER 1 OF 17 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2004:523803 HCAPLUS

DOCUMENT NUMBER: 141:208566

TITLE: Synthesis and photochromic properties of novel yellow developing photochromic compounds

AUTHOR(S): Takami, Shizuka; Irie, Masahiro

CORPORATE SOURCE: Department of Chemistry and Biochemistry, Graduate School of Engineering, Kyushu University, Higashi-ku, Fukuoka, 812-8581, Japan

SOURCE: Tetrahedron (2004), 60(29), 6155-6161

CODEN: TETRAB; ISSN: 0040-4020

PUBLISHER: Elsevier Science B.V.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Two 1-thiazolyl-2-thienylcyclopentene derivs. and a 1-thiazolyl-2-vinylcyclopentene derivative have been synthesized in an attempt to obtain photochromic compds. which change the color from colorless to yellow, and have low photocycloreversion quantum yields and high absorption coeffs. of the colored isomers. All of these compds. underwent reversible photochromic reactions. The two thienyl compds. in toluene solns. changed

upon 313 nm light irradiation from colorless to orange and pink, in which absorption maxima were observed at 494 nm ( $\epsilon = 10,000 \text{ M}^{-1} \text{ cm}^{-1}$ ) and 525 nm ( $\epsilon = 8500 \text{ M}^{-1} \text{ cm}^{-1}$ ), resp. On the other hand, the colorless toluene solution of the vinyl compound turned yellow upon irradiation with 313 nm light, in which the absorption maximum was observed at 416 nm ( $\epsilon = 17,100 \text{ M}^{-1} \text{ cm}^{-1}$ ). The photocyclization/cycloreversion quantum yields of the vinyl compound were 0.19 and 0.0014, resp. The conversion from the open- to the closed-ring isomer of the vinyl compound in the photostationary state under irradiation with 313 nm light was close to 100%.

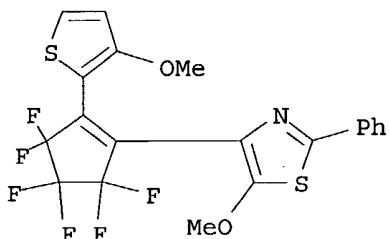
IT 743457-62-7P

RL: RCT (Reactant); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); RACT (Reactant or reagent); USES (Uses)

(colorless form; preparation and properties of yellow/colorless photochromic dyes)

RN 743457-62-7 HCAPLUS

CN Thiazole, 4-[3,3,4,4,5,5-hexafluoro-2-(3-methoxy-2-thienyl)-1-cyclopenten-1-yl]-5-methoxy-2-phenyl- (9CI) (CA INDEX NAME)



REFERENCE COUNT: 33 THERE ARE 33 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 2 OF 17 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2004:429928 HCAPLUS

DOCUMENT NUMBER: 140:423578

TITLE: Preparation of di(3-thienyl)perfluorocyclopentenenes for photochromic materials, color dosimeters, and optical memory devices

INVENTOR(S): Shiga, Yasushi; Tanaka, Yuki; Imamura, Satoru; Goromaru, Hideki

PATENT ASSIGNEE(S): Mitsubishi Chemical Corp., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 44 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

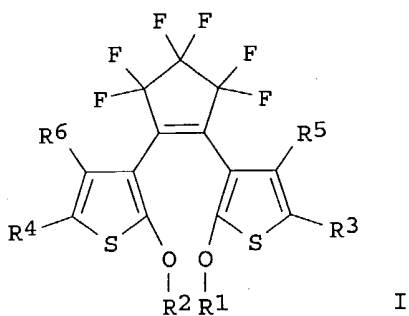
LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2004149501	A2	20040527	JP 2002-337100	20021120
PRIORITY APPLN. INFO.:			JP 2002-258843	A 20020904
OTHER SOURCE(S):		MARPAT 140:423578		

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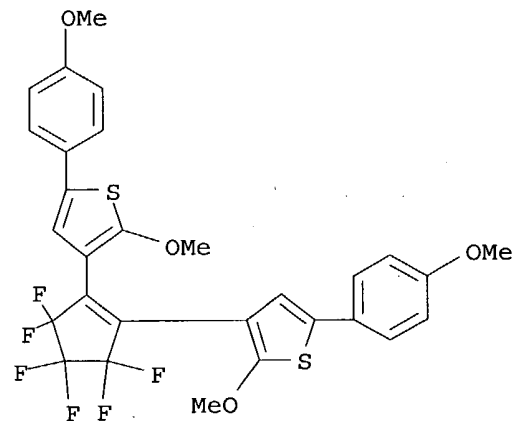
AB Title compds. I [R1, R2 = C1-4 alkyl; R3, R4 = (substituted) naphthyl, (substituted) styryl, (substituted) phenylethyl, (substituted) phenyl; R5, R6 = H, substituent] are prepared. Thus, 4-methoxyphenylboric acid was treated with 3,5-dibromo-2-methoxythiophene and treated with perfluorocyclopentene to give I (R1 = R2 = Me, R3 = R4 = 4-MeOPh, R5 = R6 = H). Then, a dosimeter using I (R1-R6 = same as above) was irradiated with x-ray at 15 Gy to give yellow-green color showing good lightfastness.

IT 693226-33-4P 693226-35-6P 693226-37-8P  
693226-38-9P 693226-39-0P 693226-40-3P  
693226-41-4P 693226-42-5P 693226-43-6P

RL: DEV (Device component use); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses) (preparation of dithienylperfluorocyclopentenenes for photochromic materials, color dosimeters, and optical memory devices)

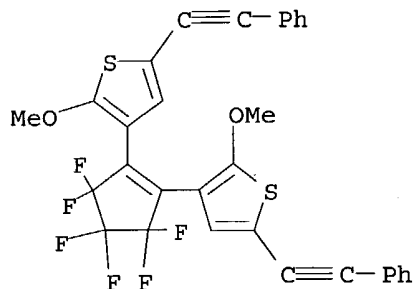
RN 693226-33-4 HCAPLUS

CN Thiophene, 3,3'-(3,3,4,4,5,5-hexafluoro-1-cyclopentene-1,2-diyl)bis[2-methoxy-5-(4-methoxyphenyl)- (9CI) (CA INDEX NAME)



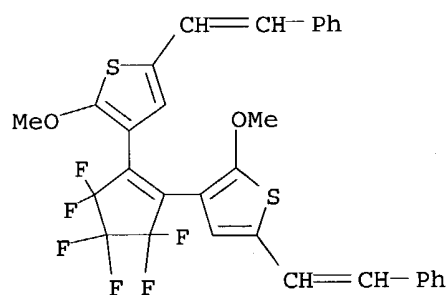
RN 693226-35-6 HCAPLUS

CN Thiophene, 3,3'-(3,3,4,4,5,5-hexafluoro-1-cyclopentene-1,2-diyl)bis[2-methoxy-5-(phenylethynyl)- (9CI) (CA INDEX NAME)



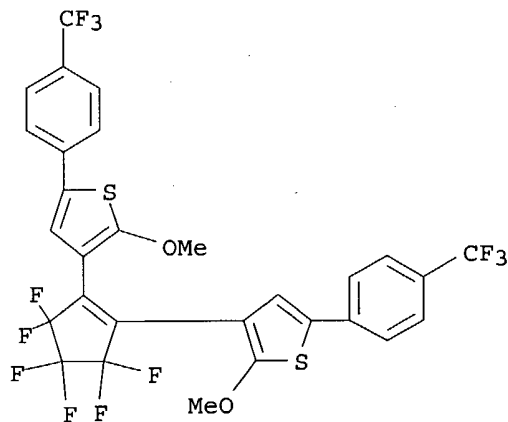
RN 693226-37-8 HCAPLUS

CN Thiophene, 3,3'-(3,3,4,4,5,5-hexafluoro-1-cyclopentene-1,2-diyl)bis[2-methoxy-5-(2-phenylethenyl)- (9CI) (CA INDEX NAME)



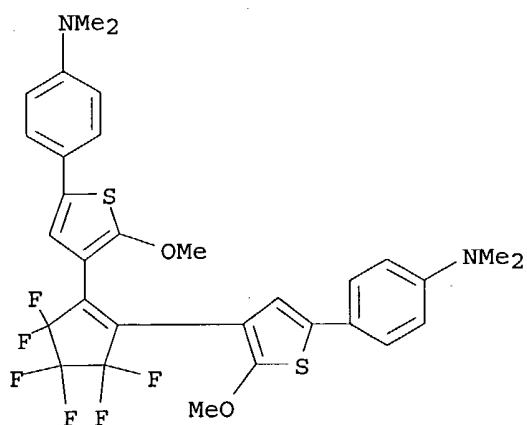
RN 693226-38-9 HCAPLUS

CN Thiophene, 3,3'-(3,3,4,4,5,5-hexafluoro-1-cyclopentene-1,2-diyl)bis[2-methoxy-5-[4-(trifluoromethyl)phenyl]- (9CI) (CA INDEX NAME)



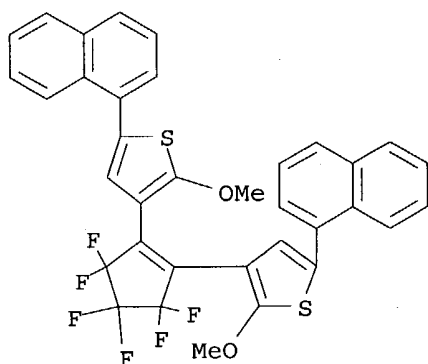
RN 693226-39-0 HCAPLUS

CN Benzenamine, 4,4'-[(3,3,4,4,5,5-hexafluoro-1-cyclopentene-1,2-diyl)bis(5-methoxy-4,2-thiophenediyl)]bis[N,N-dimethyl- (9CI) (CA INDEX NAME)



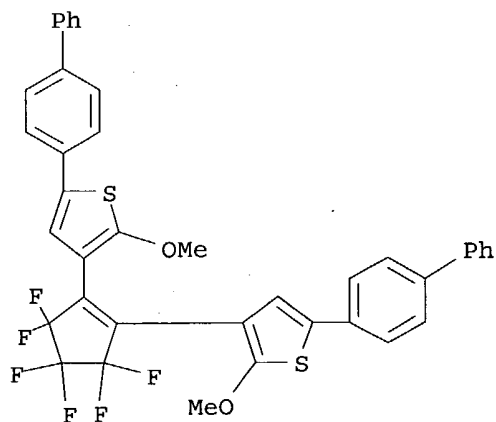
RN 693226-40-3 HCAPLUS

CN Thiophene, 3,3'-(3,3,4,4,5,5-hexafluoro-1-cyclopentene-1,2-diyl)bis[2-methoxy-5-(1-naphthalenyl)- (9CI) (CA INDEX NAME)



RN 693226-41-4 HCAPLUS

CN Thiophene, 3,3'-(3,3,4,4,5,5-hexafluoro-1-cyclopentene-1,2-diyl)bis[5-[1,1'-biphenyl]-4-yl-2-methoxy- (9CI) (CA INDEX NAME)

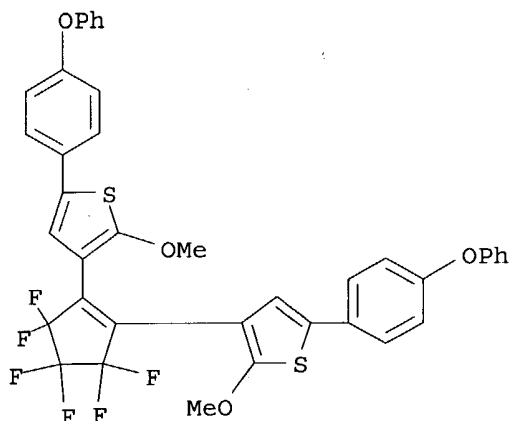


RN 693226-42-5 HCAPLUS

CN Thiophene, 3,3'-(3,3,4,4,5,5-hexafluoro-1-cyclopentene-1,2-diyl)bis[2-

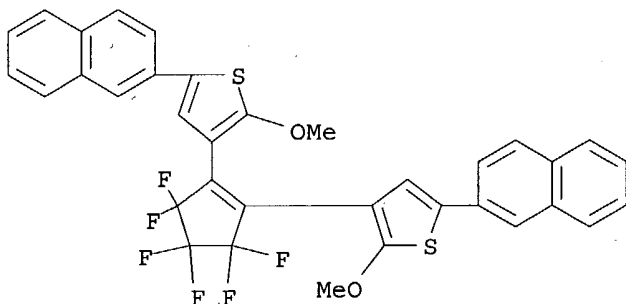


methoxy-5-(4-phenoxyphenyl)-(9CI) (CA INDEX NAME)



RN 693226-43-6 HCAPLUS

CN Thiophene, 3,3'-(3,3,4,4,5,5-hexafluoro-1-cyclopentene-1,2-diyl)bis[2-methoxy-5-(2-naphthalenyl)-(9CI) (CA INDEX NAME)



L10 ANSWER 3 OF 17 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2004:98037 HCAPLUS

DOCUMENT NUMBER: 140:172248

TITLE: Optical recording medium containing photochromic compound and methods of recording and regenerating information in optical memory element using two-photon absorption reaction

INVENTOR(S): Imamura, Satoru; Irie, Masahiro

PATENT ASSIGNEE(S): Mitsubishi Chemical Corp., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 31 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2004039009	A2	20040205	JP 2002-190519	20020628
PRIORITY APPLN. INFO.:			JP 2002-190519	20020628

OTHER SOURCE(S): MARPAT 140:172248

AB The optical recording medium comprises an optical memory element having a recording layer housed in a cartridge having an optical gate member,

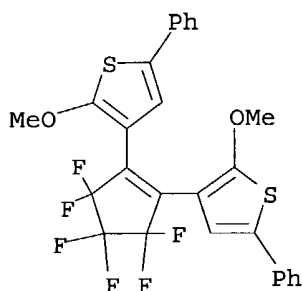
wherein the recording layer contains a diarylethene photochromic compound with a ring opening quantum yield  $\leq 0.005$  and the optical gate member is made from a material capable of cutting off a sp. wavelength which initiates the ring opening reaction for the diarylethene photochromic compound

IT 359863-61-9P

RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(preparation of diarylethene photochromic compound for optical recording medium)

RN 359863-61-9 HCAPLUS

CN Thiophene, 3,3'-(3,3,4,4,5,5-hexafluoro-1-cyclopentene-1,2-diyl)bis[2-methoxy-5-phenyl- (9CI) (CA INDEX NAME)



L10 ANSWER 4 OF 17 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2003:834226 HCAPLUS

DOCUMENT NUMBER: 139:330372

TITLE: Rewritable photochromic image display media, image formation using them, and color display devices using them with low energy consumption

INVENTOR(S): Kawashima, Ikue; Takahashi, Hiroyuki; Hirano, Shigenobu

PATENT ASSIGNEE(S): Ricoh Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 7 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2003302717	A2	20031024	JP 2002-110250	20020412
PRIORITY APPLN. INFO.:			JP 2002-110250	20020412

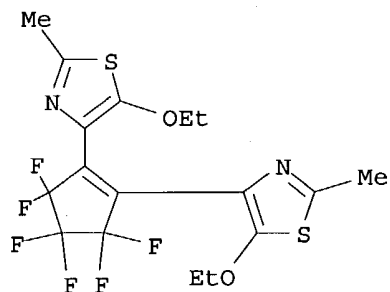
AB The medium contains a photosensitive layer containing 3 photochromic compds., each of which has different threshold wavelength ( $\lambda$ ) sufficient for the transition from a decolored state to a color-developed state by light absorption. An image is formed by (A) irradiating each pixel of the medium (containing 3 photochromic compds. with  $\lambda_1$ ,  $\lambda_2$ , and  $\lambda_3$ , resp., wherein  $\lambda_1 < \lambda_2 < \lambda_3$ ) with light of wavelength shorter than  $\lambda_1$ , (B) irradiating each of the pixels showing insufficient color development with light of wavelength between  $\lambda_1$  and  $\lambda_2$ , (C) irradiating each of the pixels showing insufficient color development with light of wavelength between  $\lambda_2$  and  $\lambda_3$ , (D) irradiating each of the pixels showing surplus color development by the process A with light for decoloration, and (E) irradiating each of the pixels showing surplus color development by the process A and B with decoloration light.

IT 210490-48-5

RL: DEV (Device component use); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)  
 (photochromic compound; rewritable color displays with low energy consumption using 3 photochromic compds. with different threshold wavelengths)

RN 210490-48-5 HCAPLUS

CN Thiazole, 4,4'-(3,3,4,4,5,5-hexafluoro-1-cyclopentene-1,2-diyl)bis[5-ethoxy-2-methyl- (9CI) (CA INDEX NAME)



L10 ANSWER 5 OF 17 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2003:707227 HCAPLUS

DOCUMENT NUMBER: 139:252573

TITLE: Medium for recording and display containing photochromic material

INVENTOR(S): Irie, Masahiro

PATENT ASSIGNEE(S): JSR Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 7 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

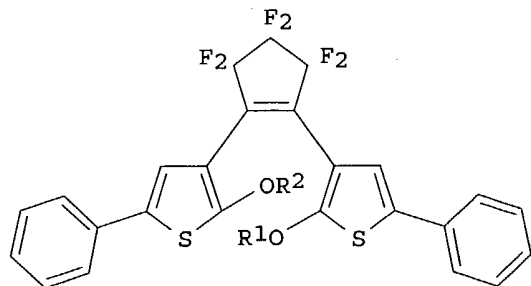
LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2003255489	A2	20030910	JP 2002-58920	20020305
PRIORITY APPLN. INFO.:			JP 2002-58920	20020305
OTHER SOURCE(S):	MARPAT 139:252573			

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AB The medium has a recording layer containing a photochromic diarylethene I [R1, R2 = (substituted) C<sub>≥3</sub> branched or cyclic hydrocarbyl], which is UV-irradiated for recording and heated for erasing of the recorded information. Information can be repeatedly recorded and erased because I shows discoloration prevention under visible light and ring opening under heat.

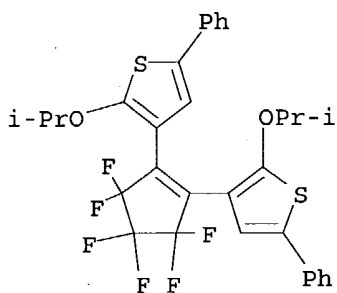
IT **443890-92-4P**, 1,2-Bis(2-isopropoxy-5-phenyl-3-thienyl)perfluorocyclopentene

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(medium containing photochromic diarylethene for repeated recording and erasing of information)

RN 443890-92-4 HCAPLUS

CN Thiophene, 3,3'-(3,3,4,4,5,5-hexafluoro-1-cyclopentene-1,2-diyl)bis[2-(1-methylethoxy)-5-phenyl- (9CI) (CA INDEX NAME)



L10 ANSWER 6 OF 17 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2003:508870 HCAPLUS

DOCUMENT NUMBER: 139:92826

TITLE: Method and apparatus for reversibly displaying photochromic multicolor images

INVENTOR(S): Hirano, Shigenobu; Takahashi, Hiroyuki

PATENT ASSIGNEE(S): Ricoh Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 8 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2003186143	A2	20030703	JP 2001-387550	20011220
PRIORITY APPLN. INFO.:			JP 2001-387550	20011220

AB An imaging medium comprising a substrate and a photosensitive layer containing  $\geq 2$  kinds of photochromic compds. having different maximum absorption wavelength in color developed conditions is so irradiated with  $\geq 2$  kinds of UV with different wavelength as to colorize all the photochromic compds., and then so irradiated with a visible light with wavelength corresponding to the maximum absorption wavelength of a prescribed photochromic compound as to selectively fade its color. The imaging apparatus is equipped with the medium, and a UV source and a visible light source both are capable of line-like scanning the medium. The imaging medium can be repeatedly used.

IT **210490-48-5**

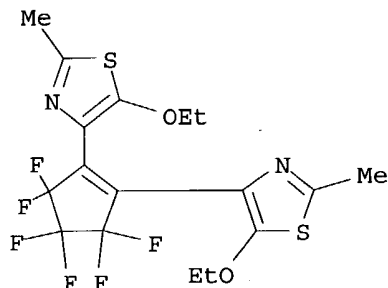
RL: TEM (Technical or engineered material use); USES (Uses)

(photochromic; in photochromic multicolor imaging apparatus and method employing UV for developing all colors and visible light for

selectively fading colors)

RN 210490-48-5 HCAPLUS

CN Thiazole, 4,4'-(3,3,4,4,5,5-hexafluoro-1-cyclopentene-1,2-diyl)bis[5-ethoxy-2-methyl- (9CI) (CA INDEX NAME)



L10 ANSWER 7 OF 17 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:977921 HCAPLUS

DOCUMENT NUMBER: 138:63893

TITLE: Diarylethene photochromic material and color dose meter using the same

INVENTOR(S): Tanaka, Yuki; Kijima, Naoto; Nakamura, Shinichirou; Irie, Masahiro; Irie, Setsuko

PATENT ASSIGNEE(S): Mitsubishi Chemical Corporation, Japan

SOURCE: PCT Int. Appl., 64 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2002102923	A1	20021227	WO 2002-JP5972	20020614
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
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JP 2003064353	A2	20030305	JP 2002-165674	20020606
EP 1405891	A1	20040407	EP 2002-736111	20020614
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US 2004178394	A1	20040916	US 2003-479982	20031215
PRIORITY APPLN. INFO.:			JP 2001-181418	A 20010615
			WO 2002-JP5972	W 20020614

AB The invention relates to: a photochromic material which comprises an illuminant emitting a light by the irradiation of a radiation thereto and a diarylethene type photochromic compound having a specific structure; and a color dose meter using the photochromic material. The dose meter can be used for detecting a radiation irradiated with good efficiency and determining the dose of the radiation with improved sensitivity.

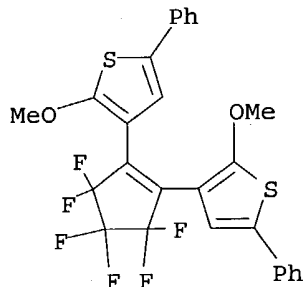
IT 359863-61-9

RL: TEM (Technical or engineered material use); USES (Uses)

(photochromic material; diarylethene photochromic material and color dose meter using the same)

RN 359863-61-9 HCAPLUS

CN Thiophene, 3,3'-(3,3,4,4,5,5-hexafluoro-1-cyclopentene-1,2-diyl)bis[2-methoxy-5-phenyl- (9CI) (CA INDEX NAME)



REFERENCE COUNT: 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 8 OF 17 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:958346 HCAPLUS

DOCUMENT NUMBER: 138:278250

TITLE: Organic chemistry: A digital fluorescent molecular photoswitch

AUTHOR(S): Irie, Masahiro; Fukaminato, Tuyoshi; Sasaki, Takatoshi; Tamai, Naoto; Kawai, Tsuyoshi

CORPORATE SOURCE: Graduate School of Engineering, Department of Chemistry and Biochemistry, Kyushu University, Higashi-ku, Fukuoka, 812-8581, Japan

SOURCE: Nature (London, United Kingdom) (2002), 420(6917), 759-760

CODEN: NATUAS; ISSN: 0028-0836

PUBLISHER: Nature Publishing Group

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The authors designed and synthesized a fluorescent photoswitching mol. in which photochromic 1,2-bis(2-methoxy-4-phenyl-3-thienyl)perfluorocyclopentene and fluorescent 1,5-dimethoxy-9,10-bis(phenylethynyl)anthracene are linked through an adamantyl spacer. The open-ring form (A) of this mol. is converted to the closed-ring form (B) upon irradiation with UV light, and B returns to A under visible light; both forms are thermally stable. The fluorescence spectrum of the bis(phenylethynyl)anthracene unit at 503 nm matches the absorption spectrum of the closed-ring form of the photochromic unit, so the fluorescence is efficiently quenched when the photochromic unit is converted from the open- to the closed-ring form upon UV irradiation. Photoswitching is detected by confocal microscopy. The authors have shown that digital switching of the fluorescence of diarylethene mols. can be controlled by irradiation with UV and visible light at the single-mol. level. The authors fluorescent diarylethene derivative may find application in the design of erasable media for ultrahigh-d. optical data storage.

IT 503310-89-2

RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)

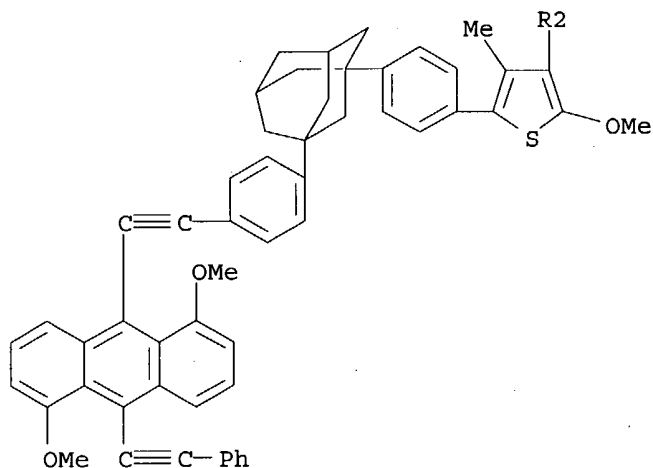
(digital switching of fluorescence of photochromic diarylethene mol. controlled by irradiation with UV and visible light at single mol. level)

RN 503310-89-2 HCAPLUS

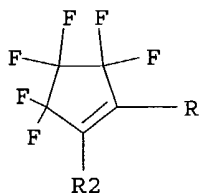
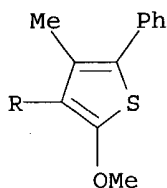
CN Thiophene, 2-[4-[3-[4-[[1,5-dimethoxy-10-(phenylethynyl)-9-anthracenyl]ethynyl]phenyl]tricyclo[3.3.1.1.3,7]dec-1-yl]phenyl]-4-

[3,3,4,4,5,5-hexafluoro-2-(2-methoxy-4-methyl-5-phenyl-3-thienyl)-1-cyclopenten-1-yl]-5-methoxy-3-methyl- (9CI) (CA INDEX NAME)

PAGE 1-A



PAGE 2-A



REFERENCE COUNT: 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 9 OF 17 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:900044 HCAPLUS

DOCUMENT NUMBER: 138:204612

TITLE: Photochromism of dithiazolylenes having methoxy groups at the reaction centers

AUTHOR(S): Takami, Shizuka; Kawai, Tsuyoshi; Irie, Masahiro

CORPORATE SOURCE: Fukuoka IST, Fukuoka Industry, Science and Technology Foundation, Fukuoka, 812-8581, Japan

SOURCE: European Journal of Organic Chemistry (2002), (22), 3796-3800

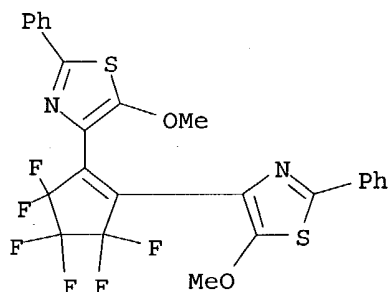
CODEN: EJOCFK; ISSN: 1434-193X

PUBLISHER: Wiley-VCH Verlag GmbH & Co. KGaA

DOCUMENT TYPE: Journal  
 LANGUAGE: English  
 OTHER SOURCE(S): CASREACT 138:204612

AB Photochromic dithiazolylethenes [1,2-bis(5-methoxy-2-phenylthiazol-4-yl)perfluorocyclopentene (1a) and (5-methoxy-2-phenylthiazol-4-yl)-2-(5-methyl-2-phenylthiazol-4-yl)perfluorocyclopentene (2a)] having methoxy substituents at the reaction centers were synthesized and their photochromic reactivity was compared with 1,2-bis(5-methyl-2-phenylthiazol-4-yl)perfluorocyclopentene (3a), which has Me substituents at the reaction centers. All dithiazolylethene derivs. underwent reversible photocyclization reactions from the open-ring forms 1a, 2a, and 3a to the closed-ring forms 1b, 2b, and 3b, resp. The photocyclization quantum yields of 1a and 2a were only slightly lower than that of 3a, while the photocycloreversion quantum yields of 1b and 2b dramatically decreased relative to that of 3b by factors of 100 and 10, resp. Absorption maxima of dithiazolylethene derivs. 1b, 2b, and 3b showed a hypsochromic shift as much as 50-80 nm relative to that of dithienylethene derivs. This is explained by the difference in the HOMO-LUMO band gap between the two systems.

IT 459424-54-5P  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
 (photocyclization; photochromism of dithiazolylethenes having methoxy groups at the reaction centers involved in photocyclization and photocycloreversion)  
 RN 459424-54-5 HCAPLUS  
 CN Thiazole, 4,4'-(3,3,4,4,5,5-hexafluoro-1-cyclopentene-1,2-diyl)bis[5-methoxy-2-phenyl- (9CI) (CA INDEX NAME)



REFERENCE COUNT: 22 THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 10 OF 17 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:802605 HCAPLUS

DOCUMENT NUMBER: 137:317042

TITLE: Thermally stable photochromic bithiophenylcyclopentene compound, and color dosimeter employing same showing stability for small amount of visible ray

INVENTOR(S): Irie, Masahiro; Irie, Setsuko; Tanaka, Yuki; Maeda, Shuichi; Nakamura, Shinichiro

PATENT ASSIGNEE(S): Japan Science and Technology Corporation, Japan; Mitsubishi Chemical Corp.

SOURCE: Jpn. Kokai Tokkyo Koho, 6 pp.  
 CODEN: JKXXAF

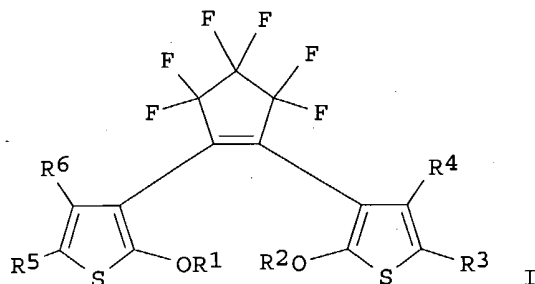
DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1



## PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2002309244	A2	20021023	JP 2001-110036	20010409
PRIORITY APPLN. INFO.:			JP 2001-110036	20010409
OTHER SOURCE(S):	MARPAT	137:317042		
GI				



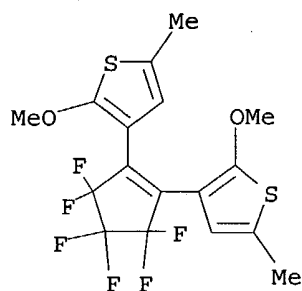
AB A photochromic bithiophenylcyclopentene compound I (R1-2 = Me, Et; R3-6 = H, C1-6 linear or branched alkyl) showing high stability for small amount of visible ray is claimed.

IT 455884-71-6P

RL: PNU (Preparation, unclassified); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(in preparation of photochromic bithiophenylcyclopentene compound for color dosimeter)

RN 455884-71-6 HCAPLUS

CN Thiophene, 3,3'-(3,3,4,4,5,5-hexafluoro-1-cyclopentene-1,2-diyl)bis[2-methoxy-5-methyl- (9CI) (CA INDEX NAME)



L10 ANSWER 11 OF 17 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:696062 HCAPLUS

DOCUMENT NUMBER: 137:239798

TITLE: Diheteroarylethene photochromic material

INVENTOR(S): Irie, Masahiro

PATENT ASSIGNEE(S): Japan Science and Technology Corporation, Japan

SOURCE: PCT Int. Appl., 29 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2002070624	A1	20020912	WO 2002-JP1946	20020304
W: US				
RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR				
JP 2003064354	A2	20030305	JP 2001-60382	20010305
JP 2004045037	A2	20040212	JP 2002-27001	20020204
EP 1367111	A1	20031203	EP 2002-701690	20020304
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR				
US 2004049040	A1	20040311	US 2003-649868	20030828
PRIORITY APPLN. INFO.:			JP 2001-60382	A 20010305
			WO 2002-JP1946	W 20020304

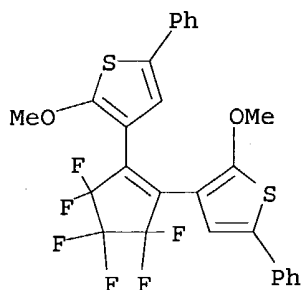
AB The invention relates to a photochromic material which has a quantum yield in ring-opening reaction of  $\leq 10^{-3}$  and suffers no color fading in the ambient light. This material comprises a diheteroarylethene compound, in which each heteroaryl group has an alkoxyl group and an aryl group.

IT 359863-61-9P 443890-91-3P 459424-54-5P

RL: SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(diheteroarylethene photochromic material)

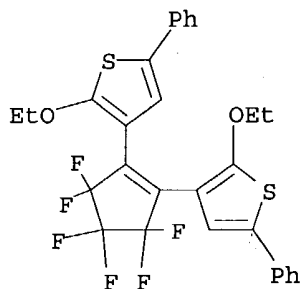
RN 359863-61-9 HCAPLUS

CN Thiophene, 3,3'-(3,3,4,4,5,5-hexafluoro-1-cyclopentene-1,2-diyl)bis[2-methoxy-5-phenyl- (9CI) (CA INDEX NAME)



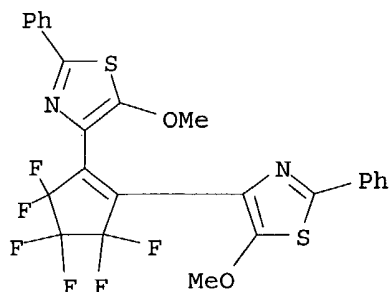
RN 443890-91-3 HCAPLUS

CN Thiophene, 3,3'-(3,3,4,4,5,5-hexafluoro-1-cyclopentene-1,2-diyl)bis[2-ethoxy-5-phenyl- (9CI) (CA INDEX NAME)



RN 459424-54-5 HCAPLUS

CN Thiazole, 4,4'-(3,3,4,4,5,5-hexafluoro-1-cyclopentene-1,2-diyl)bis[5-methoxy-2-phenyl- (9CI) (CA INDEX NAME)



REFERENCE COUNT: 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 12 OF 17 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:524065 HCAPLUS

DOCUMENT NUMBER: 137:224012

TITLE: An ab Initio MO Study of the Photochromic Reaction of Dithienylethenes

AUTHOR(S): Guillaumont, Dominique; Kobayashi, Takao; Kanda, Katsuya; Miyasaka, Hiroshi; Uchida, Kingo; Kobatake, Seiya; Shibata, Katsunori; Nakamura, Shinichiro; Irie, Masahiro

CORPORATE SOURCE: MCC-Group Science Technology Research Center and ACT-JST, Mitsubishi Chemical Corporation, Aoba-ku, Yokohama, 227-8502, Japan

SOURCE: Journal of Physical Chemistry A (2002), 106(31), 7222-7227

CODEN: JPCAFH; ISSN: 1089-5639

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB An ab initio MO study on a model system for photochromic compds. containing a dithienylethene unit is presented. On the basis of the obtained potential energy profile, a rationalization is provided for the proposed mechanism of the exptl. observed stepwise multiphoton process in the ring-opening cycloreversion reaction. An explanation, which correlates the exptl. quantum yields with the calculated properties as a function of substituent effects, is provided. A method has been developed which can be utilized as a guiding principle for future mol. design.

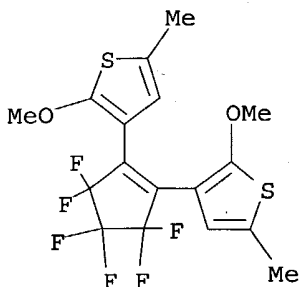
IT 455884-71-6

RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)

(ab initio MO study of photochromic reaction of substituted dithienylethenes)

RN 455884-71-6 HCAPLUS

CN Thiophene, 3,3'-(3,3,4,4,5,5-hexafluoro-1-cyclopentene-1,2-diyl)bis[2-methoxy-5-methyl- (9CI) (CA INDEX NAME)



REFERENCE COUNT: 33 THERE ARE 33 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 13 OF 17 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:449086 HCAPLUS

DOCUMENT NUMBER: 137:192641

TITLE: Thermal cycloreversion reaction of a photochromic dithienylperfluorocyclopentene with tert-butoxy substituents at the reactive carbons

AUTHOR(S): Morimitsu, Kentaro; Shibata, Katsunori; Kobatake, Seiya; Irie, Masahiro

CORPORATE SOURCE: Department of Chemistry and Biochemistry, Graduate School of Engineering, Kyushu University, Japan  
Science and Technology Corporation, Fukuoka, 812-8581, Japan

SOURCE: Chemistry Letters (2002), (6), 572-573

CODEN: CMLTAG; ISSN: 0366-7022

PUBLISHER: Chemical Society of Japan

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Tert-Butoxy groups were introduced at 2 and 2'-positions of the thiophene rings of a dithienylperfluorocyclopentene to prepare a photochromic compound with a thermal cycloreversion reactivity and a low photocycloreversion quantum yield. The cycloreversion quantum yield was similar to the isopropyl-substituted derivative and the half-life time of the colored isomer at 100° C was 8 s.

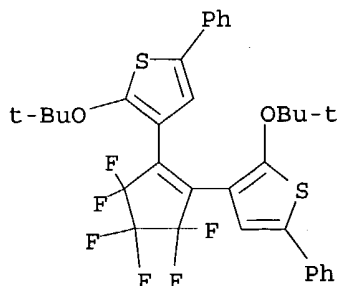
IT 449736-73-6P

RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)

(thermal cycloreversion reaction of photochromic dithienylperfluorocyclopentene with tert-butoxy substituents at reactive carbons)

RN 449736-73-6 HCAPLUS

CN Thiophene, 3,3'-(3,3,4,4,5,5-hexafluoro-1-cyclopentene-1,2-diyl)bis[2-(1,1-dimethylethoxy)-5-phenyl- (9CI) (CA INDEX NAME)



REFERENCE COUNT: 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 14 OF 17 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:409373 HCAPLUS

DOCUMENT NUMBER: 137:131965

TITLE: Dithienylethenes with a novel photochromic performance

AUTHOR(S): Morimitsu, Kentaro; Shibata, Katsunori; Kobatake, Seiya; Irie, Masahiro

CORPORATE SOURCE: Department of Chemistry and Biochemistry Graduate School of Engineering, Kyushu University and CREST Japan Science and Technology Corporation, Higashi-ku Fukuoka, 812-8581, Japan

SOURCE: Journal of Organic Chemistry (2002), 67(13), 4574-4578 CODEN: JOCEAH; ISSN: 0022-3263

PUBLISHER: American Chemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Dithienylethenes with low decoloration quantum yields and thermal reversibility at high temperature above 100 °C were prepared. Introduction of bulky alkoxy substituents at 2- and 2'-positions of the thiophene rings strongly suppressed the cycloreversion quantum yields. The quantum yields were lower than 10<sup>-3</sup>, and the photogenerated color remained stable enough under room light. On the other hand, the bulky alkoxy substituent decreased the thermal stability of the colored closed-ring isomers at high temperature. The color of the dithienylethene with cyclohexyloxy substituents faded out in less than 1 min at 160 °C.

IT 359863-61-9P, 1,2-Bis(2-methoxy-5-phenyl-3-thienyl)perfluorocyclopentene 443890-91-3P 443890-92-4P

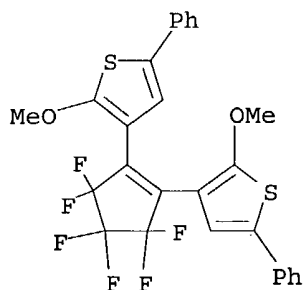
, 1,2-Bis(2-isopropoxy-5-phenyl-3-thienyl)perfluorocyclopentene

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)

(synthesis and photochromism of dithienylethene derivs. with low decoloration quantum yields and thermal reversibility at high temperature)

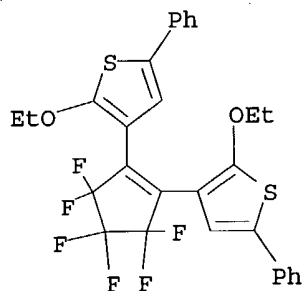
RN 359863-61-9 HCAPLUS

CN Thiophene, 3,3'-(3,3,4,4,5,5-hexafluoro-1-cyclopentene-1,2-diyl)bis[2-methoxy-5-phenyl- (9CI) (CA INDEX NAME)



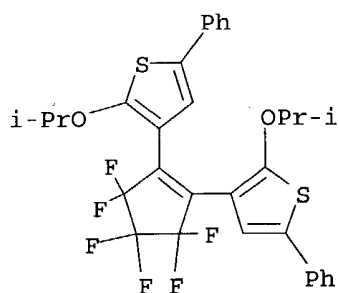
RN 443890-91-3 HCAPLUS

CN Thiophene, 3,3'-(3,3,4,4,5,5-hexafluoro-1-cyclopentene-1,2-diyl)bis[2-ethoxy-5-phenyl- (9CI) (CA INDEX NAME)



RN 443890-92-4 HCAPLUS

CN Thiophene, 3,3'-(3,3,4,4,5,5-hexafluoro-1-cyclopentene-1,2-diyl)bis[2-(1-methylethoxy)-5-phenyl- (9CI) (CA INDEX NAME)



REFERENCE COUNT: 24 THERE ARE 24 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 15 OF 17 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:315217 HCAPLUS

DOCUMENT NUMBER: 136:321657

TITLE: Method and device for the manipulation of microcarriers for an identification purpose

INVENTOR(S): Leblans, Marc Jan Rene; Gustin, Emmanuel Marie Paul Ernest; Roelant, Christiaan Hubert Simon; De Smedt, Stefaan Cornelis; Demeester, Joseph; Braeckmans, Kevin

PATENT ASSIGNEE(S): Tibotec N.V., Belg.; Universiteit Gent

SOURCE: PCT Int. Appl., 72 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2002033419	A1	20020425	WO 2001-EP12194	20011019
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
AU 2002019052	A5	20020429	AU 2002-19052	20011019

EP 1346224 A1 20030924 EP 2001-987881 20011019  
 R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,  
 IE, SI, LT, LV, FI, RO, MK, CY, AL, TR  
 BR 2001014757 A 20031007 BR 2001-14757 20011019  
 JP 2004524512 T2 20040812 JP 2002-536555 20011019  
 NO 2003001787 A 20030502 NO 2003-1787 20030422  
 PRIORITY APPLN. INFO.: EP 2000-203627 A 20001019  
 WO 2001-EP12194 A 20011019

AB The present invention relates to a method for the manipulation for an identification purpose of a microcarrier comprising the steps of: (a) an identification purpose step of the microcarrier; and (b) a positioning and orientation step prior to or during the identification purpose step, wherein the identification purpose step is a detection step for the detection of an identifiable or encoded microcarrier and a labeling step resulting in an identifiable or encoded microcarrier. The invention further relates to an apparatus for the manipulation for identification purposes of a microcarrier comprising means for identification purposes such as a microscope or labeling means such as a high spatial resolution light source, and means for the positioning and orientation of the microcarriers and to a microcarrier suitable for use in a method according to the invention.

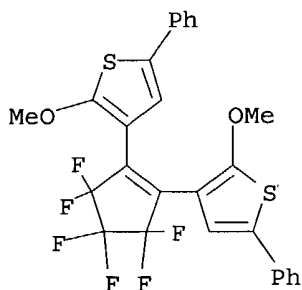
IT 359863-61-9

RL: PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

(polystyrene microspheres loaded with, in encoding by photochroming; method and device for manipulation of microcarriers for identification purpose)

RN 359863-61-9 HCAPLUS

CN Thiophene, 3,3'-(3,3,4,4,5,5-hexafluoro-1-cyclopentene-1,2-diyl)bis[2-methoxy-5-phenyl- (9CI) (CA INDEX NAME)



REFERENCE COUNT: 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 16 OF 17 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2001:505801 HCAPLUS

DOCUMENT NUMBER: 135:249343

TITLE: Extraordinarily low cycloreversion quantum yields of photochromic diarylethenes with methoxy substituents

AUTHOR(S): Shibata, Katsunori; Kobatake, Seiya; Irie, Masahiro

CORPORATE SOURCE: Department of Chemistry and Biochemistry, Graduate School of Engineering, Kyushu University, Japan  
 Science and Technology Corporation, Fukuoka, 812-8581, Japan

SOURCE: Chemistry Letters (2001), (7), 618-619

CODEN: CMLTAG; ISSN: 0366-7022

PUBLISHER: Chemical Society of Japan

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Diarylperfluorocyclopentenenes having 2-methoxy-5-phenylthiophene as the aryl groups were synthesized. Introduction of 2 methoxy substituents instead of Me groups at the reactive carbons of 1,2-bis(5-phenyl-3-thienyl)perfluorocyclopentene decreased the photocycloreversion quantum yield by a factor of 103, while the cyclization quantum yield was similar.

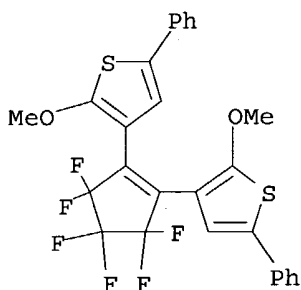
IT 359863-61-9P

RL: PEP (Physical, engineering or chemical process); RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); PROC (Process); RACT (Reactant or reagent)

(synthesis of, in study of low cycloreversion quantum yield of photochromic diarylethenes with methoxy substituents)

RN 359863-61-9 HCAPLUS

CN Thiophene, 3,3'-(3,3,4,4,5,5-hexafluoro-1-cyclopentene-1,2-diyl)bis[2-methoxy-5-phenyl- (9CI) (CA INDEX NAME)



REFERENCE COUNT: 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L10 ANSWER 17 OF 17 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1998:344727 HCAPLUS

DOCUMENT NUMBER: 129:135796

TITLE: Thermally irreversible photochromic systems.  
Reversible photocyclization of 1,2-bis(thiazolyl)perfluorocyclopentenenes

AUTHOR(S): Uchida, Kingo; Ishikawa, Takayuki; Takeshita, Michinori; Irie, Masahiro

CORPORATE SOURCE: Department Materials Chemistry, Ryukoku University, Seta, 520-2194, Japan

SOURCE: Tetrahedron (1998), 54(24), 6627-6638

CODEN: TETRAB; ISSN: 0040-4020

PUBLISHER: Elsevier Science Ltd.

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Diarylethenes having thiazole rings, 1,2-bis(4-thiazolyl)perfluorocyclopentenenes and 1,2-bis(5-thiazolyl)perfluorocyclopentenenes, were synthesized. The binding positions of the thiazole rings to the perfluorocyclopentene moiety strongly affected the absorption spectra. The absorption maxima of the open- and closed-ring forms of 1,2-bis(5-methyl-2-phenyl-4-thiazolyl)perfluorocyclopentene were observed at 300 nm and 525 nm, resp., while the maxima of 1,2-bis(4-methyl-2-phenyl-5-thiazolyl)perfluorocyclopentene shifted to 363 nm (open-ring form) and 406 nm (closed-ring form).

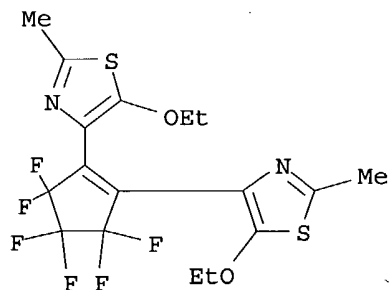
IT 210490-48-5P

RL: PRP (Properties); RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)

(preparation and reversible photocyclization of bis(thiazolyl)perfluorocyclopentene derivs.)



RN 210490-48-5 HCAPLUS  
 CN Thiazole, 4,4'-(3,3,4,4,5,5-hexafluoro-1-cyclopentene-1,2-diyl)bis[5-ethoxy-2-methyl- (9CI) (CA INDEX NAME)



REFERENCE COUNT: 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

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L3 STR  
 L5 2042 SEA FILE=REGISTRY SSS FUL L3  
 L6 STR  
 L7 564 SEA FILE=REGISTRY SUB=L5 SSS FUL L6  
 L8 STR  
 L9 18 SEA FILE=REGISTRY SUB=L7 SSS FUL L8  
 L11 546 SEA FILE=REGISTRY ABB=ON PLU=ON L7 NOT L9  
 L12 310 SEA FILE=HCAPLUS ABB=ON PLU=ON L11  
 L13 208 SEA FILE=HCAPLUS ABB=ON PLU=ON L12 AND PD=<SEPTEMBER 11, 2002  
 L14 53 SEA FILE=HCAPLUS ABB=ON PLU=ON L13 AND PATENT/DT  
 L15 162 SEA FILE=HCAPLUS ABB=ON PLU=ON L11/P  
 L16 35 SEA FILE=HCAPLUS ABB=ON PLU=ON L15 AND L14

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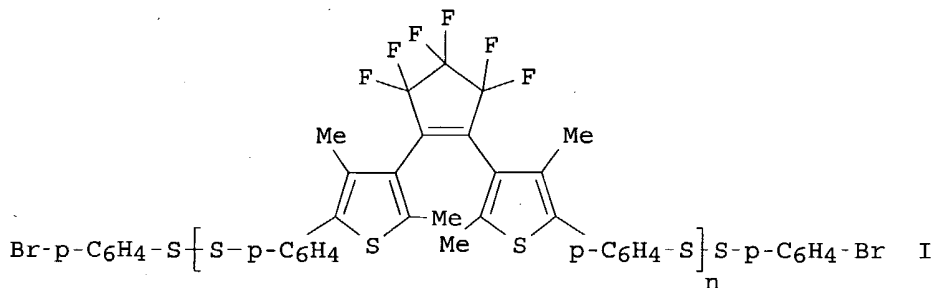
L16 ANSWER 1 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN  
 ACCESSION NUMBER: 2002:607655 HCAPLUS  
 DOCUMENT NUMBER: 137:169411  
 TITLE: Preparation of photochromic compounds for molecular wiring in nanodevices  
 INVENTOR(S): Sayo, Koichi; Iwamoto, Masahiro; Hayashi, Shigehiko; Kuroda, Kotaro  
 PATENT ASSIGNEE(S): Mitsuboshi Belting Ltd., Japan  
 SOURCE: Jpn. Kokai Tokkyo Koho, 8 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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JP 2002226477  
 PRIORITY APPLN. INFO.:  
 GI

A2 20020814 JP 2001-27951  
 JP 2001-27951

20010205 <--  
 20010205



AB Title compds. I (R1-R4 = alkyl; n ≥ 1) are prepared They form complexes with Au fine particles to give quantum dots (no data). Thus, coupling of 3-bromo-2,4-dimethylthiophene with perfluorocyclopentene gave diarylethene derivative, which was treated with (4-BrC<sub>6</sub>H<sub>4</sub>)S<sub>2</sub>(C<sub>6</sub>H<sub>4</sub>Br-4) to afford colorless I (R1-R4 = Me, n ≥ 1). The product mixture showed photochromism on UV irradiation

IT 170658-51-2P 179530-75-7P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent) (preparation of)

IT 446251-25-8P 446251-27-0P 446251-29-2P  
 446251-31-6P

RL: SPN (Synthetic preparation); PREP (Preparation) (preparation of)

L16 ANSWER 2 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:480011 HCAPLUS

DOCUMENT NUMBER: 137:70546

TITLE: Photochromic (hexahalocyclopentenyl)thiophene compounds, optical devices using them, and their preparation

INVENTOR(S): Shiota, Yasuhiko

PATENT ASSIGNEE(S): Osaka University, Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 11 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2002179672	A2	20020626	JP 2000-374330	20001208 <--
JP 3390921	B2	20030331		

PRIORITY APPLN. INFO.: JP 2000-374330 20001208

OTHER SOURCE(S): MARPAT 137:70546

GI

\* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT \*

- AB The compds. I (R1 = H, Me, Et, OMe, CHMe2, CMe3; R2 = H, C1-20 linear or branched alkyl, aryl; R3 = substituent having conjugated unsatd. bonds; X = F, Cl, Br, I), which are made into an amorphous thin film and useful for display devices, optical recording, optical switches, etc., are prepared by reacting halothiophenes II (R1-R2 = same as in I; X = F, Cl, Br) with alkyllithiums and treating the reaction products with halocyclopentenenes. 1,2-Bis[5-[4-[N,N-bis(4-methylphenyl)amino]phenyl]-2-methylthiophen-3-yl]-3,3,4,4,5,5-hexafluorocyclopentene was prepared. Quantum yield of this compound in photocyclization upon irradiation with 365 nm light was 0.61.
- IT **321584-02-5P**  
 RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (preparation of photochromic (hexahalocyclopentenyl)thiophenes for optical devices)
- IT **438633-04-6**  
 RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)  
 (preparation of photochromic (hexahalocyclopentenyl)thiophenes for optical devices)

L16 ANSWER 3 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:384315 HCAPLUS

DOCUMENT NUMBER: 136:402547

TITLE: Dithienylethene derivative and optical-control type conjugated polymers for photochromic materials

INVENTOR(S): Akagi, Kazuo

PATENT ASSIGNEE(S): Foundation for Scientific Technology Promotion, Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 10 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

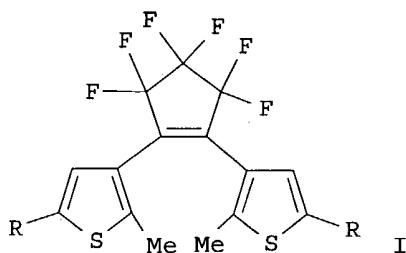
LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2002145878	A2	20020522	JP 2000-340472	20001108 <--
PRIORITY APPLN. INFO.:			JP 2000-340472	20001108
OTHER SOURCE(S):	MARPAT 136:402547			

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- AB The photochromic materials with good responsiveness, thermal stability and durability are derived from I (R = hydrocarbyl or substituted hydrocarbyl) or I polymers. [1,2-Bis(5'-formyl-2'-methylthiophene-3'-yl)perfluorocyclopentene] was prepared and polymerized with p-xylene-bis(triphenylphosphonium bromide) using K2CO3 in DMF to give a copolymer showing photochromism on UV irradiation
- IT **154566-75-3P 428821-68-5P 428821-69-6P**  
**428821-70-9P 428821-71-0P 428821-72-1P**

**428821-73-2P 428821-74-3P 428821-75-4P**

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (dithienylethene derivative and optical-control type conjugated polymers for photochromic materials)

L16 ANSWER 4 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

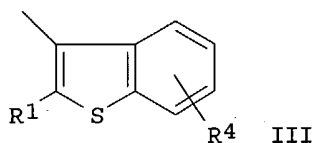
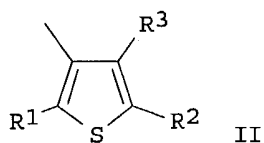
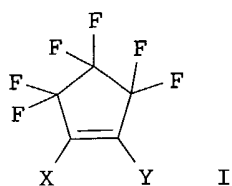
ACCESSION NUMBER: 2002:244787 HCAPLUS  
 DOCUMENT NUMBER: 136:286305  
 TITLE: Optically active amorphous photochromic material  
 INVENTOR(S): Yamaguchi, Tadatsugu; Nakazumi, Hiroyuki; Irie, Masahiro  
 PATENT ASSIGNEE(S): Japan  
 SOURCE: Jpn. Kokai Tokkyo Koho, 10 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: **Patent**  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2002097462	A2	20020402	JP 2000-285662	20000920 <--
PRIORITY APPLN. INFO.:			JP 2000-285662	20000920
AB The invention refers to an optically active diheteroaryl ethene amorphous photochromic material, wherein one or both of the heteroaryl rings is 5-membered heterocyclic ring with optically active substituents, for diastereo selective photocyclization.				
IT <b>406225-11-4P 406225-13-6P</b>				
RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses) (optically active amorphous photochromic material)				
IT <b>406225-12-5</b>				
RL: RCT (Reactant); RACT (Reactant or reagent) (optically active amorphous photochromic material)				
IT <b>342812-71-9P 342812-72-0P</b>				
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent) (optically active amorphous photochromic material)				

L16 ANSWER 5 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:221143 HCAPLUS  
 DOCUMENT NUMBER: 136:254603  
 TITLE: Near-field optical recording medium and method containing photochromic compounds  
 INVENTOR(S): Irie, Masahiro; Maeda, Shuichi  
 PATENT ASSIGNEE(S): Mitsubishi Chemical Corporation, Japan  
 SOURCE: U.S. Pat. Appl. Publ., 29 pp., Cont.-in-part of Appl. No. PCT/JP00/01404.  
 CODEN: USXXCO  
 DOCUMENT TYPE: **Patent**  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 2  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2002034705	A1	20020321	US 2001-949795	20010912 <--
PRIORITY APPLN. INFO.:			JP 1999-64406	A 19990311
			WO 2000-JP1404	A2 20000308
OTHER SOURCE(S): MARPAT 136:254603				
GI				



AB A near-field optical recording medium comprises a recording layer capable of writing, reading and erasing information using an evanescent light, the evanescent light having a beam spot size smaller than the wavelength of a source light, wherein the recording layer is a stable amorphous layer mainly comprising a photochromic compound I (X, Y = II, III (R1 = alkyl, alkoxy; R2 = alkyl, alkoxy, alkylthio, aromatic, aromatic heterocyclic group; R3 = H, alkyl, alkoxy; R4 = H, alkyl, alkenyl, alkoxy, alkylthio, etc.)) having a glass transition point of 55° C. or higher and a mol. weight of 3000 or less.

IT 252253-50-2P

RL: DEV (Device component use); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
(recording layer; photochromic compound for near-field optical recording medium)

L16 ANSWER 6 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:157033 HCAPLUS

DOCUMENT NUMBER: 136:209642

TITLE: New coordinative linkages with bis(thien-3-yl)perfluorocyclopentene for use as magneto-optical, photochromic molecular switches with room temperature.

INVENTOR(S): Guetlich, Philipp; Lapouyade, Rene; Garcia, Yann; Ksenofontov, Vadim

PATENT ASSIGNEE(S): Germany

SOURCE: Ger. Offen., 8 pp.

CODEN: GWXXBX

DOCUMENT TYPE: **Patent**

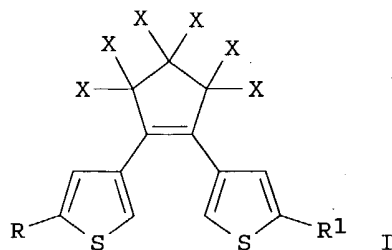
LANGUAGE: German

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 10039903	A1	20020228	DE 2000-10039903	20000816 <--
PRIORITY APPLN. INFO.:			DE 2000-10039903	20000816
OTHER SOURCE(S):		MARPAT 136:209642		

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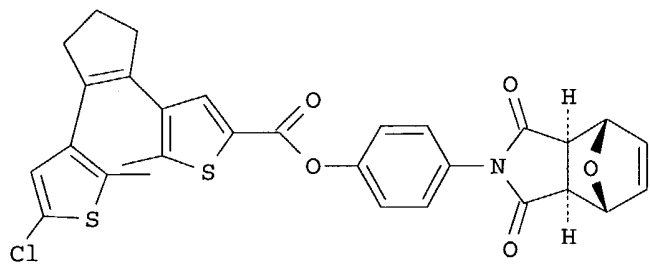
- AB The invention concerns coordinative linkages based bis(thien-3-yl)perfluorocyclopentene for use as magnetooptical, photochromic mol. switches. The coordinative linkages are from bis(thien-3-yl)perfluorocyclopentene, whereby the transition metals have a partial occupied d-shell with 4 to 8 d-electrons as well as photochromic ligands, which are substituted with N heterocycles e.g. pyridine, triazole, isoxazole, bipyridine, phenanthroline. The photochromic ligands can contain the following structure I (X = the elements and/or groups of H, F, Cl, I, Br, OH, NO<sub>2</sub>, CnH<sub>2n+1</sub> or CnH<sub>2n</sub>S and R = heterocycle, and R1 = a strongly electroactive substituent). The compds. are solids and affect both on light and magnetic changes with strong color change. For example, 1,2-bis[5'-(2''-(4-pyridyl)ethynyl)-2'-methylthien-3'-yl]perfluorocyclopentene (L) was prepared in a multistep process from bromination of 2-methylthiophene, followed by conversion to 2-methyl-3-bromo-5-trimethylsilylthiophene, the lithiated product of which reacted with perfluorocyclopentene, followed by deprotection. [FeL(NCS)] was prepared which on exposure to green light underwent a color change from intense orange to dark blue which was reirradiated with red light with a color change from blue back to orange. The magnetic susceptibility of both colored forms of [FeL(NCS)] was determined
- IT 154566-71-9P 401591-89-7P  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
(preparation and complexation with iron)
- IT 401591-89-7DP, iron complex  
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
(preparation and magnetooptical and photochromic properties for use as magnetooptical, photochromic mol. switches)
- IT 154566-71-9DP, iron complex  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(preparation of)

L16 ANSWER 7 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2002:72173 HCAPLUS  
DOCUMENT NUMBER: 136:135194  
TITLE: Photochromic polymers and methods of synthesizing same  
INVENTOR(S): Branda, Neil R.; Myles, Andrew J.  
PATENT ASSIGNEE(S): Simon Fraser University, Can.  
SOURCE: PCT Int. Appl., 31 pp.  
CODEN: PIXXD2  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2002006361	A2	20020124	WO 2001-CA1033	20010713 <--
WO 2002006361	A3	20020321		
W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			
RW:	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG			
JP 2004504421	T2	20040212	JP 2002-512261	20010713
US 2004030078	A1	20040212	US 2003-332944	20030915
PRIORITY APPLN. INFO.:			US 2000-218132P	P 20000714

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- AB Ring-opening metathesis polymerization (ROMP) of a photochromic 1,2-bis-(3-thienyl)-cyclopentene monomer generated a series of polymers. All polymers exhibit reversible light-activated interconversion between their colorless-open and their colored-closed forms. I was prepared and polymerized using bis(tricyclohexylphosphine)benzylidene ruthenium(IV)dichloride catalyst.
- IT **391895-11-7P 391895-12-8P**  
 RL: IMF (Industrial manufacture); PREP (Preparation)  
 (photochromic polymers and methods of synthesizing same)
- IT **391895-10-6P**  
 RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT  
 (Reactant or reagent)  
 (photochromic polymers and methods of synthesizing same)
- IT **222730-43-0**  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (photochromic polymers and methods of synthesizing same)

L16 ANSWER 8 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2001:707335 HCAPLUS

DOCUMENT NUMBER: 135:280211

TITLE: Photochromic material and optical recording media

INVENTOR(S): Sakata, Tadafumi; Ogura, Kazuyuki; Kojima, Seiji; Irie, Masahiro

PATENT ASSIGNEE(S): Minolta Camera Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 18 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

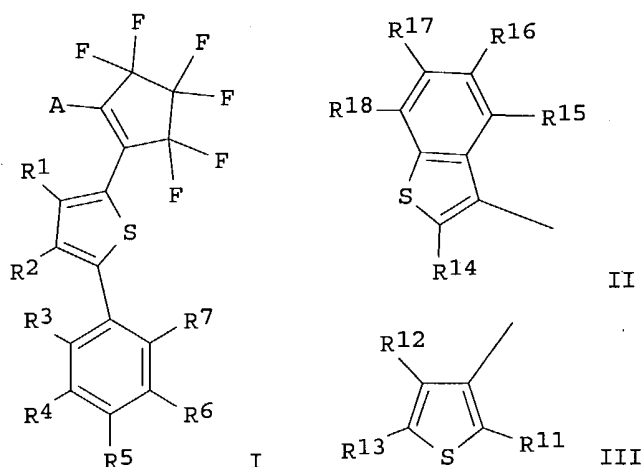
LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2001262135	A2	20010926	JP 2000-83459	20000324 <--
PRIORITY APPLN. INFO.:			JP 2000-83459	20000324
OTHER SOURCE(S):	MARPAT	135:280211		

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AB The invention refers to a diaryl ethene photochromic material I, [R1 = alkyl or alkoxy, R2-7 = H, alkyl or alkoxy or aryl; A = II or III; R 11,14 = (un)substituted alkyl or alkoxy; R12,13,15-18 = H, (un)substituted alkoxy or aryl] suitable for use in optical recording media.

IT **362513-30-2P 362513-31-3P**

RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)

(photochromic material and optical recording media)

L16 ANSWER 9 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2001:681483 HCAPLUS

DOCUMENT NUMBER: 135:249232

TITLE: Photochromic molecular ingredient

INVENTOR(S): Irie, Masahiro

PATENT ASSIGNEE(S): Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 7 pp.

CODEN: JKXXAF

DOCUMENT TYPE: **Patent**

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2001254074	A2	20010918	JP 2000-65426	20000309 <--
PRIORITY APPLN. INFO.:			JP 2000-65426	20000309

AB The invention refers to a photochromic material comprising a diheteroarylene ethene with a fluorescent substituent in a heteroaryl ring.

IT **351011-32-0P**

RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)

(photochromic mol. ingredient)

IT **360561-24-6P**

RL: SPN (Synthetic preparation); PREP (Preparation)

(photochromic mol. ingredient)

L16 ANSWER 10 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2001:510345 HCAPLUS

DOCUMENT NUMBER: 135:68624

TITLE: Diarylethene photochromic compounds and photochromic



INVENTOR(S): recording devices  
 Fukudome, Masato; Kamiyama, Kazushi  
 PATENT ASSIGNEE(S): Kyocera Corporation, Japan  
 SOURCE: Fr. Demande, 98 pp.  
 CODEN: FRXXBL  
 DOCUMENT TYPE: **Patent**  
 LANGUAGE: French  
 FAMILY ACC. NUM. COUNT: 3  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
FR 2799200	A1	20010406	FR 2000-11144	20000831 <--
JP 2001064276	A2	20010313	JP 1999-244194	19990831 <--
JP 2001151769	A2	20010605	JP 1999-336817	19991126 <--
JP 2001048875	A2	20010220	JP 2000-87321	20000327 <--
PRIORITY APPLN. INFO.:			JP 1999-244194	A 19990831
			JP 1999-336817	A 19991126
			JP 2000-87321	A 20000327
			JP 1999-150655	A 19990528

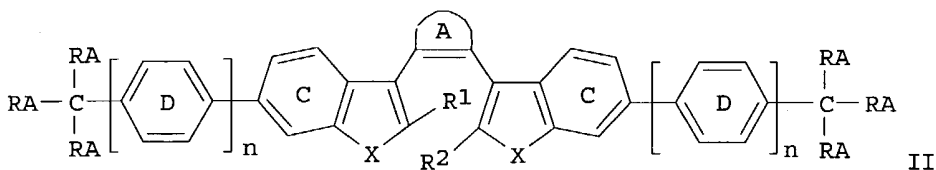
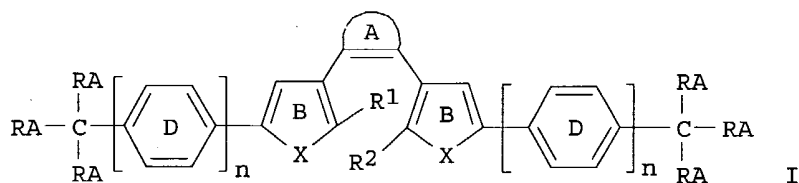
AB The invention relates to new diarylene photochromic compds. The photochromic compound forms a coated thin amorphous film and shows the excellent thermal stability. The film shows the large reflection index difference between the isomers and suitable for use as an optical memory or an optical communication device.

IT **326877-36-5P 346414-42-4P 346414-44-6P**  
 RL: PNU (Preparation, unclassified); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
 (diarylethene photochromic compds. and photochromic recording devices)

L16 ANSWER 11 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2001:174089 HCAPLUS  
 DOCUMENT NUMBER: 134:229751  
 TITLE: Diarylethene photochromic compounds and photochromic recording devices  
 INVENTOR(S): Fukutome, Masato  
 PATENT ASSIGNEE(S): Kyocera Corp., Japan  
 SOURCE: Jpn. Kokai Tokkyo Koho, 11 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: **Patent**  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 3  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2001064276	A2	20010313	JP 1999-244194	19990831 <--
DE 10042603	A1	20010628	DE 2000-10042603	20000830 <--
US 6359150	B1	20020319	US 2000-650875	20000830 <--
FR 2799200	A1	20010406	FR 2000-11144	20000831 <--
PRIORITY APPLN. INFO.:			JP 1999-244194	A 19990831
			JP 1999-336817	A 19991126
			JP 2000-87321	A 20000327
OTHER SOURCE(S):			MARPAT 134:229751	
GI				



AB Photochromic compds. I and II [R1-2 = H, alkyl; RA = (un)substituted aromatic ring or heterocycle; X = O, S, N; A = aliphatic ring, acid anhydride, maleimide; B, C, and D may have substitution group; n = integer or 1-3] are claimed. Also claimed is an imaging device comprising of a thin layer of the photochromic compds. Films of the compds. can be formed by spin coating to give devices having resistance to repeated use.

IT 329075-72-1P

RL: DEV (Device component use); IMF (Industrial manufacture); PREP (Preparation); USES (Uses)

(diarylethene photochromic compds. and photochromic memory devices)

L16 ANSWER 12 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2001:128280 HCAPLUS

DOCUMENT NUMBER: 134:200596

TITLE: Photochromic compound and optical element using it

INVENTOR(S): Fukutome, Masato

PATENT ASSIGNEE(S): Kyocera Corp., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 15 pp.

CODEN: JKXXAF

DOCUMENT TYPE:

Patent

LANGUAGE:

Japanese

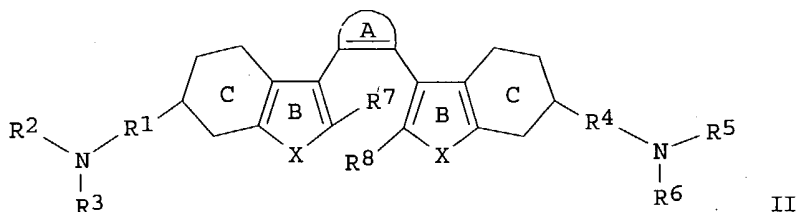
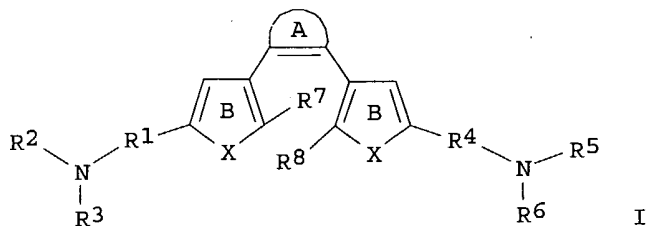
FAMILY ACC. NUM. COUNT: 3

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2001048875	A2	20010220	JP 2000-87321	20000327 <--
DE 10042603	A1	20010628	DE 2000-10042603	20000830 <--
US 6359150	B1	20020319	US 2000-650875	20000830 <--
FR 2799200	A1	20010406	FR 2000-11144	20000831 <--
PRIORITY APPLN. INFO.:			JP 1999-150655	A 19990528
			JP 1999-244194	A 19990831
			JP 1999-336817	A 19991126
			JP 2000-87321	A 20000327

OTHER SOURCE(S): MARPAT 134:200596

GI



AB The photochromic compound I and II [R1-6 = (substituted) aryl; R7-8 = H, alkoxy, alkyl; X = O, S, N; ring A = alicyclic, aromatic, acid anhydride, maleimide group; ring B and C may be substituted] are claimed. Optical recording material and optical waveguide for optical switching using the thin film of the photochromic compound are also claimed. The compound forms thin film without using polymer binder and shows good durability and optical property.

IT 326877-36-5P

RL: DEV (Device component use); PNU (Preparation, unclassified); PREP (Preparation); USES (Uses)

(thiophene derivative photochromic compound for optical instrument)

L16 ANSWER 13 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2001:124363 HCAPLUS

DOCUMENT NUMBER: 134:186014

TITLE: Diarylethene-type substance involving perfluorocyclopentene as photochromic material and optical recording medium

INVENTOR(S): Ogura, Kazuyuki; Kojima, Seiji

PATENT ASSIGNEE(S): Minolta Camera Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 12 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

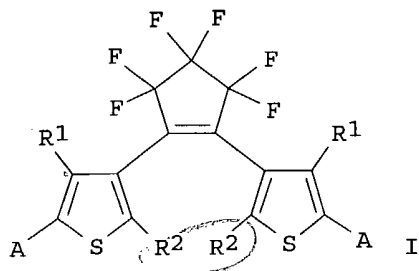
LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2001049244	A2	20010220	JP 1999-221194	19990804 <--
PRIORITY APPLN. INFO.:			JP 1999-221194	19990804
OTHER SOURCE(S):	MARPAT	134:186014		

GI



AB The photochromic material is that represented as I [R1, R2 = H, (substituted) alkyl, (substituted) alkoxy; A = (substituted) condensed polycyclic aromatic group, (substituted) polyphenyl group residue]. The material can be manufactured by processes with reduced number of reactions and the ring-opened isomer shows light absorption band nearby the visible range. The recording medium uses the photochromic material for optical recording, reading, and erasing information.

IT 326497-02-3P 326497-03-4P

RL: DEV (Device component use); IMF (Industrial manufacture); PREP (Preparation); USES (Uses)

(diarylethene-type photochromic material involving perfluorocyclopentene for erasable optical recording material)

L16 ANSWER 14 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2000:873301 HCAPLUS

DOCUMENT NUMBER: 134:49257

TITLE: Diarylethene for organic photochromic film

INVENTOR(S): Sayo, Koichi; Iwamoto, Masahiro; Hayashi, Shigehiko; Kuroda, Kotaro; Uchida, Kingo; Irie, Masahiro

PATENT ASSIGNEE(S): Mitsuboshi Belting Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 13 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

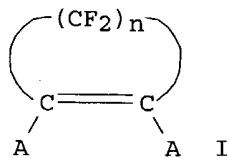
LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2000344693	A2	20001212	JP 1999-244049	19990830 <--
PRIORITY APPLN. INFO.:			JP 1999-88998	A 19990330
OTHER SOURCE(S):	MARPAT	134:49257		

GI



AB The diarylethene for organic photochromic film has structure I (n = 2-5 integer; A = 2,4,6-alkyl, 2,6-alkyl, 4-cyano substituted phenyl). The diarylethene is durable and show the excellent discoloring characteristics.

IT 139911-02-7P 313055-81-1P 313055-83-3P

**313055-85-5P**

RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(diarylethene for organic photochromic film)

L16 ANSWER 15 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2000:658227 HCAPLUS

DOCUMENT NUMBER: 133:259392

TITLE: Amorphous photochromic material for optical switching

using refractive index changes

INVENTOR(S): Irie, Masahiro; Kawai, Takeshi

PATENT ASSIGNEE(S): Foundation for Scientific Technology Promotion, Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 5 pp.

CODEN: JKXXAF

DOCUMENT TYPE: **Patent**

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2000256664	A2	20000919	JP 1999-64447	19990311 <--
PRIORITY APPLN. INFO.:			JP 1999-64447	19990311
AB The invention relates to an amorphous photochromic material for a optical switch, wherein the photochromic material is an diheteroarylethene having hetero 5-membered ring substituted with a tert-Bu group. The photochromic material is suitable for use as an optical switch according to the refractive index changes.				
IT <b>295342-90-4P</b>				
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation) (amorphous photochromic material)				
IT <b>252253-50-2P</b>				
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent) (amorphous photochromic material)				

L16 ANSWER 16 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2000:654524 HCAPLUS

DOCUMENT NUMBER: 133:259390

TITLE: Optically active photochromic crystal for nonlinear optical device

INVENTOR(S): Irie, Masahiro

PATENT ASSIGNEE(S): Foundation for Scientific Technology Promotion, Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 5 pp.

CODEN: JKXXAF

DOCUMENT TYPE: **Patent**

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2000256665	A2	20000919	JP 1999-64496	19990311 <--
PRIORITY APPLN. INFO.:			JP 1999-64496	19990311
AB The invention relates to an optically active photochromic crystal for nonlinear optical device, wherein the photochromic crystal is an diheteroarylethene having a hetero 5-membered ring substituted with an optically active group. The photochromic material is suitable for use in nonlinear optical device production				
IT <b>295343-53-2P</b>				
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation) (optically active photochromic crystal for nonlinear optical device)				

fabrication)  
 IT 295343-51-0  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (optically active photochromic crystal for nonlinear optical device  
 fabrication)  
 IT 295343-52-1P  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT  
 (Reactant or reagent)  
 (optically active photochromic crystal for nonlinear optical device  
 fabrication)

L16 ANSWER 17 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 2000:254668 HCAPLUS  
 DOCUMENT NUMBER: 132:301014  
 TITLE: Photochromic compound optical recording substance and  
 optical recording material using it  
 INVENTOR(S): Fukutome, Masato  
 PATENT ASSIGNEE(S): Kyocera Corp., Japan  
 SOURCE: Jpn. Kokai Tokkyo Koho, 7 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2000112074	A2	20000421	JP 1998-278438	19980930 <--
PRIORITY APPLN. INFO.:			JP 1998-278438	19980930

GI For diagram(s), see printed CA Issue.  
 AB The substance is a photochromic compound I [A = halo; R1-4 = H, halo, alkyl,  
 aryl, alkoxy, amino, (all may be substituted); R5-8 = alkyl; X = S, N, O;  
 n = pos. integer; m = 2-5]. The material comprises a support coated with  
 a recording layer containing I. The substance shows high reflection change,  
 good dispersion in a polymer at high d., phase separation is prevented, and the  
 material shows good durability in repeated recording and erasing.  
 IT 264149-71-5 264149-73-7 264149-75-9  
 264149-77-1 264149-79-3 264149-81-7  
 264149-83-9 264149-85-1 264149-87-3  
 264149-89-5 264149-91-9 264149-93-1  
 264149-94-2 264149-95-3 264149-96-4  
 264149-97-5 264149-98-6 264149-99-7  
 264150-00-7 264150-01-8 264150-02-9  
 264150-03-0 264150-04-1 264150-05-2  
 264150-84-7 264150-86-9 264150-88-1  
 RL: DEV (Device component use); USES (Uses)  
 (optical recording material using photochromic compound)  
 IT 264149-67-9P  
 RL: DEV (Device component use); PNU (Preparation, unclassified); PREP  
 (Preparation); USES (Uses)  
 (optical recording material using photochromic compound)  
 IT 264149-69-1  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (polymerization of)

L16 ANSWER 18 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1999:717922 HCAPLUS  
 DOCUMENT NUMBER: 131:303406  
 TITLE: Ophthalmic lens photochromic material with stable  
 changes of refractive index and/or birefringence  
 INVENTOR(S): Biteau, John; Chaput, Frederic; Boilot, Jean Pierre;  
 Peretti, Jacques; Safarov, Viatcheslav; Levy, Yves;

Darracq, Bruno; Tsivgoulis, Gerasimos; Lehn, Jean  
Marie

PATENT ASSIGNEE(S): Ecole Polytechnique, Fr.

SOURCE: Fr. Demande, 26 pp.

CODEN: FRXXBL

DOCUMENT TYPE: **Patent**

LANGUAGE: French

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
FR 2774998	A1	19990820	FR 1998-2123	19980219 <--
PRIORITY APPLN. INFO.:			FR 1998-2123	19980219
<p>AB An ophthalmic lens photochromic material in which one can induce stable changes of refractive index and/or birefringence by light in the absence of illumination in the absorption bands. The material comprises photochromic mols. in a solid matrix and anisotropic mols. covalently bound to the solid. Thus, a thienylperfluorocyclopentenyl derivative was treated with 3-isocyanatopropyltriethoxysilane and the product was polymerized with methyltriethoxysilane. The polymer sol obtained was cast on a metallic or glass substrate.</p>				
IT 210246-01-8P				
<p>RL: DEV (Device component use); PRP (Properties); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); PREP (Preparation); USES (Uses)</p> <p>(ophthalmic lens photochromic material with stable changes of refractive index and/or birefringence)</p>				
IT 156686-76-9				
<p>RL: DEV (Device component use); THU (Therapeutic use); BIOL (Biological study); USES (Uses)</p> <p>(ophthalmic lens photochromic material with stable changes of refractive index and/or birefringence)</p>				
IT 156686-73-6				
<p>RL: RCT (Reactant); RACT (Reactant or reagent)</p> <p>(ophthalmic lens photochromic material with stable changes of refractive index and/or birefringence)</p>				
IT 210245-99-1P				
<p>RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)</p> <p>(ophthalmic lens photochromic material with stable changes of refractive index and/or birefringence)</p>				

L16 ANSWER 19 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1999:596902 HCAPLUS

DOCUMENT NUMBER: 131:235806

TITLE: Photochromic crystalline material for photochromic devices ✓

INVENTOR(S): Irie, Masahiro

PATENT ASSIGNEE(S): Foundation for Scientific Technology Promotion, Japan;  
Japan Science and Technology Agency

SOURCE: Jpn. Kokai Tokkyo Koho, 11 pp.

CODEN: JKXXAF

DOCUMENT TYPE: **Patent**

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 11255764	A2	19990921	JP 1998-78361	19980311 <--
JP 3538019	B2	20040614		

PRIORITY APPLN. INFO.:

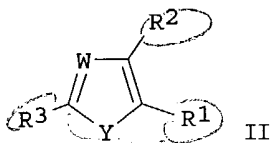
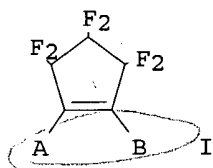
JP 1998-78361

19980311

OTHER SOURCE(S):

MARPAT 131:235806

GI



AB The photochromic crystalline material is diheteroarylethene I with an ionic substituent or the solvated diheteroarylethene I(A, B = substituent II( Y = O, S, Se, etc.; W = N, C-R5; R1-3, R5 = connecting group with perfluoropenten ring, H, alkyl, etc.; R4 = H, alkyl, cycloalkyl, aryl)). The photochromic crystalline shows photochromism without a polymer medium.

IT 243971-26-8P 243971-27-9P 243971-28-0P  
243971-29-1P 243971-30-4P 243971-31-5P  
243971-32-6P

RL: PNU (Preparation, unclassified); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(photochromic crystalline material for photochromic devices)

IT 243971-25-7

RL: RCT (Reactant); RACT (Reactant or reagent)  
(photochromic crystalline material for photochromic devices)

L16 ANSWER 20 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1998:613762 HCAPLUS

DOCUMENT NUMBER: 129:296196

TITLE: Diarylethene showing paramagnetism

INVENTOR(S): Irie, Masahiro

PATENT ASSIGNEE(S): Irie, Masahiro, Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 6 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 10251251	A2	19980922	JP 1997-54605	19970310 <--
PRIORITY APPLN. INFO.:			JP 1997-54605	19970310

AB The diarylethene contains heterocyclic 5-member rings having a stable radical substituent. The diarylethene shows the paramagnetism by the photochromic reaction.

IT 214285-45-7P

RL: SPN (Synthetic preparation); PREP (Preparation)  
(diarylethene showing paramagnetism)

L16 ANSWER 21 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1997:765500 HCAPLUS

DOCUMENT NUMBER: 128:95415

TITLE: Display media and devices using photochromic materials with rapid coloring speed and repeatability

INVENTOR(S): Irie, Masahiro; Oshima, Kenji

PATENT ASSIGNEE(S): Irie, Masahiro, Japan; Matsushita Electric Industrial Co., Ltd.

SOURCE: Jpn. Kokai Tokkyo Koho, 7 pp.



CODEN: JKXXAF

DOCUMENT TYPE: **Patent**  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 09311355	A2	19971202	JP 1996-126612	19960522 <--
PRIORITY APPLN. INFO.:			JP 1996-126612	19960522

AB Title media include coatings containing micropowd. organic photochromic compds. which are dispersed in binders [preferably poly(vinyl alcs.)]. The organic compds. may be diarylethenes. The title display devices involve information-inputing parts, erasing systems, and displaying systems. The devices display high-contrast images with reduced energy.

IT **173345-44-3P**  
 RL: DEV (Device component use); PNU (Preparation, unclassified); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses) (display devices including micropowd. photochromic compds. with excellent colorability and repeatability)

L16 ANSWER 22 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1997:251092 HCAPLUS

DOCUMENT NUMBER: 127:11140

TITLE: Preparation of diarylethene derivatives as photochromic materials

INVENTOR(S): Kabasawa, Makoto; Ishikawa, Atsushi; Babasaki, Mitsue; Kobayashi, Tatsuya; Horikawa, Yukio

PATENT ASSIGNEE(S): Kanebo, Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 30 pp.

CODEN: JKXXAF

DOCUMENT TYPE: **Patent**  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 09071585	A2	19970318	JP 1996-26183	19960118 <--
PRIORITY APPLN. INFO.:			JP 1995-184841	19950627

OTHER SOURCE(S): MARPAT 127:11140

GI For diagram(s), see printed CA Issue.

AB The title compds. (I; A = 5-ethynyl-3-thienyl, 6-ethynyl-3-benzothienyl; B = 5-ethynyl-3-thienyl, thienyl, indolyl, 6-ethynyl-3-benzothienyl; n = 2-5) are prepared I, possessing photochromic properties, are useful as recording materials, copying materials, and related optical materials. Thus, diarylethene derivative (II) was reacted with 4-iodomethoxybenzene in the presence of (Ph<sub>3</sub>P)<sub>4</sub>Pd and CuI<sub>2</sub> to give the title compound (III). III at 2.63 X 10<sup>-5</sup> mol/l in C<sub>6</sub>H<sub>6</sub> showed λ<sub>mx</sub> of 642 nm.

IT **168688-90-2P 168688-91-3P**  
 RL: IMF (Industrial manufacture); RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent) (preparation of diarylethene derivs. as photochromic materials)

IT **188440-35-9P 188440-36-0P 188440-37-1P**  
**188440-38-2P 188440-39-3P 188440-40-6P**  
**188440-41-7P 188440-47-3P**  
 RL: IMF (Industrial manufacture); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses) (preparation of diarylethene derivs. as photochromic materials)

L16 ANSWER 23 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1996:751534 HCAPLUS

DOCUMENT NUMBER: 126:59943  
 TITLE: Preparation of diarylethene-type photochromic compounds as optical recording materials  
 INVENTOR(S): Irie, Masahiro  
 PATENT ASSIGNEE(S): Irie Masahiro, Japan  
 SOURCE: Jpn. Kokai Tokkyo Koho, 31 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: **Patent**  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 08245579	A2	19960924	JP 1995-51569	19950310 <--
PRIORITY APPLN. INFO.:			JP 1995-51569	19950310

OTHER SOURCE(S): MARPAT 126:59943  
 GI For diagram(s), see printed CA Issue.  
 AB The title compds. [I; X, X' = NR, S, SO<sub>2</sub>, SO, O, Se; Y, Y' = N, C; R = H, (un)substituted alkyl, aryl, cycloalkyl; ring C and D = (un)substituted heterocycle; ring B = hydrocarbyl or N-containing ring] are prepared An optical recording medium with recording layer containing I possess excellent recording, heating resistance, and regeneration properties. Thus, 2-iodo-3-methyl-5-(4-methoxyphenyl)thiophene was treated with n-BuLi and then reacted with perfluorocyclopentene to give 27% the title compound (II). By 400 nm light irradiation, II was converted to its closing-ring derivative, which was stable at 80° for 12 h. An exchange between the closing- and opening-ring II was made >100-times by 290 nm light irradiation  
 IT **184355-42-8P 184355-43-9P**  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
 (preparation of diarylethene-type photochromic compds. as optical recording materials)  
 IT **184355-37-1P 184355-38-2P 184355-39-3P**  
 RL: SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (preparation of diarylethene-type photochromic compds. as optical recording materials)

L16 ANSWER 24 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1996:527465 HCAPLUS  
 DOCUMENT NUMBER: 125:167781  
 TITLE: Preparation of 1,2-bis[2-[4-(phenyliminomethylidene)phenyl]thiophen-4-yl]perfluorocyclopentene derivative as photochromic substance and optical recording medium and method of optical recording  
 INVENTOR(S): Sugai, Akio; Irie, Masahiro  
 PATENT ASSIGNEE(S): Mita Industrial Co., Ltd., Japan; Kyocera Mita Industrial Co., Ltd.  
 SOURCE: Jpn. Kokai Tokkyo Koho, 12 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: **Patent**  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 08143564	A2	19960604	JP 1994-280832	19941115 <--
JP 3526930	B2	20040517		
PRIORITY APPLN. INFO.:			JP 1994-280832	19941115

OTHER SOURCE(S): MARPAT 125:167781  
GI

\* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT \*

AB The title compds. (I and II; R1 = H, lower alkyl; R2 = lower alkyl; ring A and B are optionally substituted), which provide optical recording media having high isomerization ratio from the open ring form I to the closed ring form II, high contrast image, high photostability of the isomerized mols. against laser light during the data readout, markedly improved number of the playback, and stable data retention, are prepared. A method of optical recording involves (1) irradiating a layer containing I with an active light ray to form an image consisting of isomerized mols. II and reducing the latter mols. to nonphotochromic isomers (III; R1, R2, and ring A and B = same as above) to form an image consisting of III for stabilization against a readout light ray and/or (2) erasing the image by oxidizing the stabilized nonphotochromic compds. III to photochromic compds. II and then irradiating with a visible light ray. Thus, 3-iodo-2,4-dimethyl-5-(4-nitrophenyl)thiophene (preparation given) in THF was treated dropwise with BuLi/hexane at -78° and coupled with perfluorocyclopentene to give 1,2-bis(2,4-dimethyl-5-phenylthiophen-3-yl)perfluorocyclopentene. This compound was brominated by Br in the presence of Fe powder in CS2 to 1,2-bis[2,4-dimethyl-5-(4-bromophenyl)thiophen-3-yl]perfluorocyclopentene, which was lithiated by BuLi in Et2O at 0°, formylated by DMF at 0° to 1,2-bis[2,4-dimethyl-5-(4-formylphenyl)thiophen-3-yl]perfluorocyclopentene, and condensed with 4-aminodiethylaniline in refluxing benzene to give the title compound I (R1 = R2 = Me; ring B is unsubstituted and ring A is substituted with NEt2 at 4-position). The latter red color compound was irradiated with light at ≥520 nm and cyclized in 73% conversion ratio to the blue compound II (R1, R2, and ring A and B = same as above) and then reduced by CF3CO2H to the blue compound III (R1, R2, ring A and B = same as above) and oxidized back to II (R1, R2, and ring A and B = same as above) by Proton Sponge.

IT 180418-33-1P

RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)

(preparation of bis[[ (phenylazo)phenyl]thiophenyl]perfluorocyclopentene derivs. as photochromic substance and optical recording medium)

IT 172612-67-8P 180418-31-9P 180418-32-0P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)

(preparation of bis[[ (phenylazo)phenyl]thiophenyl]perfluorocyclopentene derivs. as photochromic substance and optical recording medium)

L16 ANSWER 25 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1996:527464 HCAPLUS

DOCUMENT NUMBER: 125:167780

TITLE: Preparation of 1,2-bis[2-[4-(phenylazo)phenyl]thiophen-4-yl]perfluorocyclopentene derivative as photochromic substance and optical recording medium

INVENTOR(S): Sugai, Akio; Irie, Masahiro

PATENT ASSIGNEE(S): Mita Industrial Co., Ltd., Japan; Kyocera Mita Industrial Co., Ltd.

SOURCE: Jpn. Kokai Tokkyo Koho, 10 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 08143563	A2	19960604	JP 1994-280831	19941115 <--
JP 3526929	B2	20040517		
PRIORITY APPLN. INFO.:			JP 1994-280831	19941115
OTHER SOURCE(S):	MARPAT 125:167780			
GI				

\* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT \*

AB The title compds. (I and II; R1 = H, lower alkyl; R2 = lower alkyl; ring A and B are optionally substituted by alkyl, alkoxy, aryl, cyano, OH, NH<sub>2</sub>, or halo), which provide photochromic substances and optical recording media having high molar absorption coefficient ( $\epsilon$ ), high isomerization ratio from the open ring form I to the closed ring form II, high image contrast, and improved sensitivity and recording retention, are prepared. Thus, 0.95 g 3-iodo-2,4-dimethyl-5-(4-nitrophenyl)thiophene in THF was cooled to -100°, treated dropwise with 1.6 N BuLi/hexane (2.43 mL), stirred at -100° for 1 h, treated with 0.18 mL perfluorocyclopentene in two portions, and stirred at -100° for 3 h to give 1,2-bis[2,4-dimethyl-5-(4-nitrophenyl)thiophen-3-yl]perfluorocyclopentene. This compound (0.66 g) was reduced by 60 mg NaBH<sub>4</sub> and 151.2 mg S powder in THF under reflux for 24 h to give 1,2-bis[2,4-dimethyl-5-(4-aminophenyl)thiophen-3-yl]perfluorocyclopentene, which (0.50 g) in 40 CH<sub>2</sub>Cl<sub>2</sub> was ice-cooled, treated with 16.0 mL H<sub>2</sub>SO<sub>4</sub>, 132 mg NaNO<sub>2</sub>, and 5 mg TFPB, stirred for 15 min under ice-cooling, treated with 393 mg diethylaniline, and stirred overnight to give the title compound I (R1 = R2 = Me; ring B is unsubstituted and ring A is substituted with NET<sub>2</sub> at 4-position). The latter compound (red color) showed molar absorption coefficient ( $\epsilon$ ) of 61,000 and maximum absorbency ( $\lambda_{max}$ ) at 653 nm and was cyclized into II (R1 = R2 = Me; ring B is unsubstituted and ring A is substituted with NET<sub>2</sub> at 4-position) (green color) in 65% conversion ratio.

IT 180418-27-3P 180418-28-4P

RL: DEV (Device component use); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses) (preparation of bis[[ (phenylazo)phenyl]thiophenyl]perfluorocyclopentene derivs. as photochromic substance and optical recording medium)

IT 180418-25-1P 180418-26-2P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent) (preparation of bis[[ (phenylazo)phenyl]thiophenyl]perfluorocyclopentene derivs. as photochromic substance and optical recording medium)

L16 ANSWER 26 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1996:501539 HCAPLUS

DOCUMENT NUMBER: 125:142543

TITLE: Preparation of thiophene derivatives as photochromic compounds

INVENTOR(S): Sugai, Akio; Irie, Masahiro

PATENT ASSIGNEE(S): Mita Industrial Co Ltd, Japan; Irie Masahiro

SOURCE: Jpn. Kokai Tokkyo Koho, 12 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

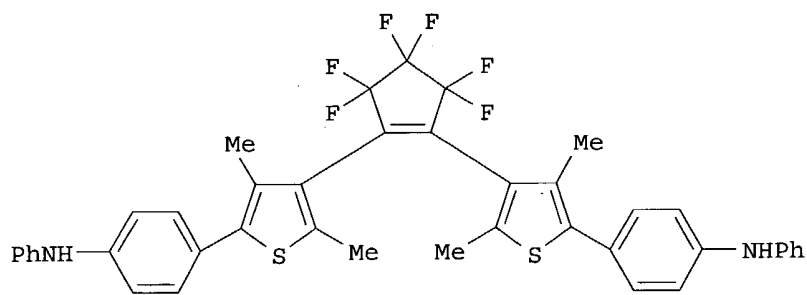
LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 08134063	A2	19960528	JP 1994-277882	19941111 <--
JP 3404156	B2	20030506		
PRIORITY APPLN. INFO.:			JP 1994-277882	19941111
OTHER SOURCE(S):	MARPAT 125:142543			

GI



AB The title compds. (Markush structures given) are prepared Recording media containing the title compds. are claimed. The title compound I was prepared in a multistep process starting with 3-methylthiophene. When exposed to UV light, I became blue.

IT **172612-67-8P**

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)

(preparation of thiophene derivs. as photochromic compds.)

IT **180003-39-8P 180003-40-1P**

RL: SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(preparation of thiophene derivs. as photochromic compds.)

L16 ANSWER 27 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1996:476715 HCAPLUS

DOCUMENT NUMBER: 125:142541

TITLE: Dithienylhexafluorocyclopentene compounds and their use as photochromic materials

INVENTOR(S): Irie, Masahiro

PATENT ASSIGNEE(S): Irie Masahiro, Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 8 pp.

CODEN: JKXXAF

DOCUMENT TYPE:

**Patent**

LANGUAGE:

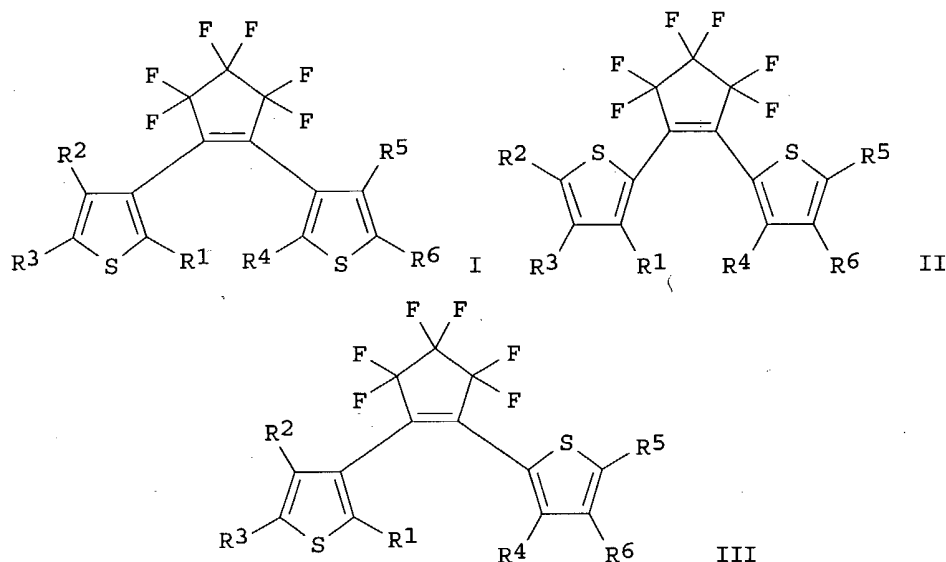
Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 08119963	A2	19960514	JP 1994-256855	19941021 <--
JP 3491704	B2	20040126		
PRIORITY APPLN. INFO.:			JP 1994-256855	19941021
OTHER SOURCE(S):	MARPAT 125:142541			

GI



AB The title compds. [I, II and III; R1, R4 = alkyl; R2, R5 = H, alkyl; R3, R6 = H, halo; especially R1 = R2 = R4 = R5 = Me], which possess photochromism in crystal state, are claimed and prepared. Photochromic materials containing these compds., which are useful for marking optical switches, photomemory medium, and polarized sun glasses, are also claimed. Thus, bromination of 2,4-dimethylthiophene followed by treatment of the dibromo intermediate with BuLi gave 2,4-dimethyl-3-bromothiophene (IV). IV was further reacted with perfluorocyclopentene to give I (R1 = R2 = R4 = R5 = Me, R3 = R6 = H), which showed red color by 313 nm UV irradiation and was decolorized by 530 nm visible light.

IT 159590-08-6P 170658-51-2P 173345-44-3P  
179530-75-7P

RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(preparation of photochromic dithienylhexafluorocyclopentenenes)

L16 ANSWER 28 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1996:268045 HCAPLUS

DOCUMENT NUMBER: 124:318184

TITLE: Thiophene derivatives and polymers

INVENTOR(S): Saika, Tetsuyuki

PATENT ASSIGNEE(S): Research Development Corporation of Japan, Japan

SOURCE: Eur. Pat. Appl., 19 pp.

CODEN: EPXXDW

DOCUMENT TYPE: Patent

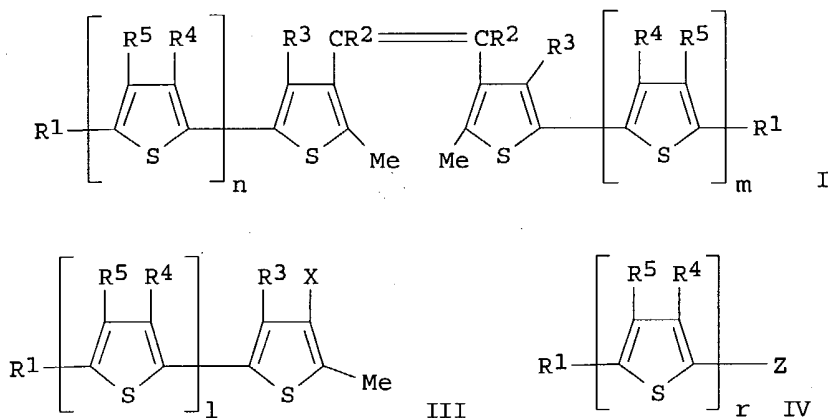
LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 698605	A1	19960228	EP 1995-305976	19950825 <--
EP 698605	B1	20011121		
R: DE, FR, GB, IT				
JP 08059651	A2	19960305	JP 1994-201134	19940825 <--
JP 3132630	B2	20010205		
US 5734065	A	19980331	US 1995-519814	19950825 <--
PRIORITY APPLN. INFO.:			JP 1994-201134	A 19940825

GI



AB Thiophene derivs. I [R1 = H, halo, or trialkylsilyl, R2 = (substituted) alkylene or C(O)OC(O) forming a ring with the C:C, R3, R4, R5 = H or alkyl, n, m > 0] are manufactured and polymd to give photochromic and electrochromic products. I (R1 = H or trialkylsilyl, R2-5, n, m = same as above) (II) are manufactured by reaction of ZCR2:CR2Z (R2 = same as in I, Z = halo) with thiophene derivs. III (R1, R3, R4, R5 = same as in I, X = halo). Alternatively, II are manufactured by reaction of I (R1 = halo, R2, R3, R4, R5, n, m = same as above) with thiophene derivs. IV [R1 = H or trialkylsilyl, R4, R5 = same as in I, r > 0, Z = B(OH)2, trialkyltin residue, or halogenated magnesium residue]. Reacting 1,2-bis(5-bromo-2-methyl-3-thienyl)hexafluorocyclopentene with Mg in THF, and polymerization of the solution of the intermediate 5 h at reflux in the presence of Ni dichloro(2,2-bipyridine) gave a polymer with mean mol. weight 1500.

IT 176043-31-5P 176043-33-7P

RL: IMF (Industrial manufacture); PREP (Preparation)  
(monomer; photochromic and electrochromic thiophene derivs. and polymers)

IT 159590-07-5P 159590-08-6P 159590-09-7P

159590-10-0P 159590-16-6P 177345-62-9P

RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)  
(monomer; photochromic and electrochromic thiophene derivs. and polymers)

IT 176043-30-4P 176043-35-9P 176043-36-0P

RL: IMF (Industrial manufacture); PREP (Preparation)  
(photochromic and electrochromic thiophene derivs. and polymers)

L16 ANSWER 29 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1996:241542 HCAPLUS

DOCUMENT NUMBER: 124:289247

TITLE: Preparation of dithienylethenes as photochromic compounds

INVENTOR(S): Kabasawa, Makoto; Ishikawa, Atsushi; Fujino, Yasumitsu; Horikawa, Yukio; Irie, Masahiro

PATENT ASSIGNEE(S): Kanebo Ltd, Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 10 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

## PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 07330762	A2	19951219	JP 1994-151454	19940608 <--
PRIORITY APPLN. INFO.:			JP 1994-151454	19940608
OTHER SOURCE(S):	MARPAT 124:289247			
GI				

\* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT \*

AB The title compds. I [n = 2 - 5; A = Q1; B = Q2; R1 - R4 = alkyl; R5 = 4-methoxyphenyl, etc.] are prepared. The title compound II (preparation given) showed photochromic property. The  $\lambda_{\max}$  of II was 672 nm.

IT 175595-57-0P 175595-58-1P 175595-59-2P

175595-60-5P

RL: SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(preparation of dithienylethenes as photochromic compds.)

L16 ANSWER 30 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1995:967690 HCAPLUS

DOCUMENT NUMBER: 124:131629

TITLE: Photochromic optical recording material containing ethylenic derivative

INVENTOR(S): Irie, Masahiro; Nakamura, Shinichiro

PATENT ASSIGNEE(S): Irie Masahiro, Japan; Mitsubishi Kagaku KK

SOURCE: Jpn. Kokai Tokkyo Koho, 13 pp.

CODEN: JKXXAF

DOCUMENT TYPE:

Patent

LANGUAGE:

Japanese

FAMILY ACC. NUM. COUNT: 1

## PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 07248569	A2	19950926	JP 1994-40858	19940311 <--
JP 3384086	B2	20030310		
PRIORITY APPLN. INFO.:			JP 1994-40858	19940311

GI For diagram(s), see printed CA Issue.

AB The recording material contains an ethylenic derivative whose C-1 and C-2 positions are substituted with substituents having a 5-membered heterocyclic  $\pi$ -conjugation chain(s) ( $\geq 1$  substituent at C-1 and C-2 has  $\geq 2$  5-membered heterocycles). The ethylenic derivative may be I [A = perfluorocycloalkyl, acid anhydride, (substituted) maleimide; R1, R2 = alkyl, alkoxy, halo, dialkylamino, CF3; R3-10 = H, alkyl, alkoxy, halo, CF3, CN, NO2, dialkylamino, (substituted) aryl; m, n = 1-5; m and/or n  $\geq 2$ ]. The material shows sensitivity to semiconductor lasers with good thermal stability.

IT 172872-72-9P

RL: DEV (Device component use); IMF (Industrial manufacture); PREP (Preparation); USES (Uses)

(photochromic optical recording material containing ethylenic derivative)

IT 172872-75-2P

RL: PNU (Preparation, unclassified); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)

(preparation and iodination of; photochromic optical recording material containing ethylenic derivative)



IT 172872-76-3P

RL: PNU (Preparation, unclassified); RCT (Reactant); PREP (Preparation);  
RACT (Reactant or reagent)(preparation and reaction with methoxythiophene; photochromic optical  
recording material containing ethylenic derivative)

L16 ANSWER 31 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1995:858525 HCAPLUS

DOCUMENT NUMBER: 123:256523

TITLE: Preparation of 1,2-bis(heterocyclyl)cyclopentenenes and  
analogs as photochromic compounds

INVENTOR(S): Lehn, Jean-Marie; Kawai, Stephen; Gilat, Sylvain

PATENT ASSIGNEE(S): Ciba-Geigy A.-G., Switz.

SOURCE: PCT Int. Appl., 112 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: German

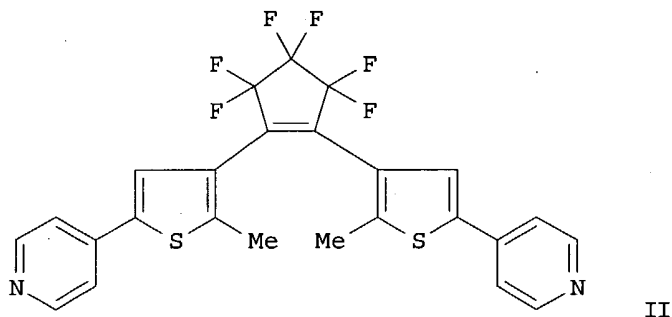
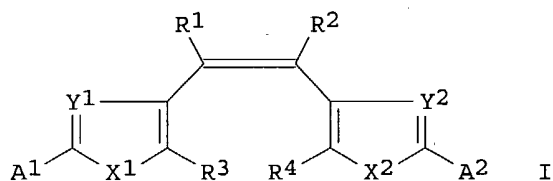
FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9507275	A1	19950316	WO 1994-EP2947	19940903 <--
W: CA, CN, JP, KR, US				
RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
EP 717740	A1	19960626	EP 1994-922875	19940903 <--
R: CH, DE, FR, GB, LI				
JP 09502432	T2	19970311	JP 1994-508445	19940903 <--
PRIORITY APPLN. INFO.:			CH 1993-2721	19930910
			WO 1994-EP2947	19940903

OTHER SOURCE(S): MARPAT 123:256523

GI



AB Title compds. [e.g., I; A1,A2 = CHO, (thio)acetal radical, Ph, etc.; R1,R2 = H, (fluoro)alkyl, cyano, etc.; R1R2 = C(:NH)NHC(:NH), CO2CO, (CF2)2-4, etc.; R3,R4 = H, Me, CF3, cyano, etc.; X1,X2 = S, O, NH, etc.; Y1,Y2 = CH or N] were prepared Thus, 3,5-dibromo-2-methylthiophene was treated with

B(OBu)<sub>3</sub> and the boronic acid product condensed with 4-bromopyridine to give 3-bromo-2-methyl-5-(4-pyridyl)thiophene which was condensed with octafluorocyclopentene to give title compound II. Data for photoinduced absorption changes for selected I were given.

IT 154566-71-9P 154566-75-3P 154566-76-4P  
 154566-77-5P 154566-78-6P 154566-83-3P  
 154586-93-3P 169030-60-8P 169030-61-9P  
 169030-62-0P 169030-63-1P 169030-64-2P  
 169030-65-3P 169030-66-4P 169030-67-5P  
 169030-69-7P 169030-70-0P 169030-71-1P  
 169030-72-2P

RL: MOA (Modifier or additive use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
 (preparation of 1,2-bis(heterocyclyl)cyclopentenes and analogs as photochromic compds.)

L16 ANSWER 32 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1995:842600 HCAPLUS

DOCUMENT NUMBER: 123:270875

TITLE: Preparation of 1,2-di(aryl or heteroaryl)perfluorocycloalkene derivative as photochromic substance and reversible optical recording medium using the same for optical recording and regeneration

INVENTOR(S): Fujino, Yasumitsu; Ishikawa, Atsushi; Kabasawa, Makoto; Horikawa, Yukio; Irie, Masahiro

PATENT ASSIGNEE(S): Kanebo Ltd, Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 20 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

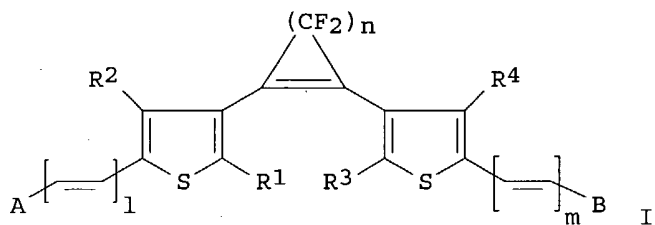
LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

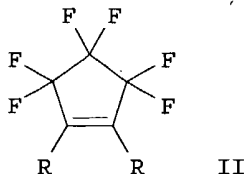
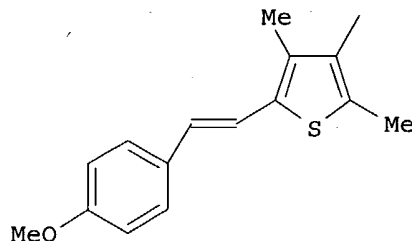
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 07173151	A2	19950711	JP 1993-338827	19931201 <--
PRIORITY APPLN. INFO.:			JP 1992-350483	19921202
			JP 1993-287571	19931022
OTHER SOURCE(S):		MARPAT 123:270875		

GI



Q=



AB The title compds. (I; n = 2-5; l, m = 0-2; R1, R3 = alkyl; R2, R4 = H, alkyl, dialkylamino, cyano, NO<sub>2</sub>, alkoxy; A, B = aryl, heterocyclyl) are prepared Thus, a solution of 1.7 g 3-iodothiophene derivative (Q-I) (preparation given)

in 50 mL THF was cooled to -75°, treated dropwise with 4.8 mmol BuLi/hexane, and the resulting mixture was stirred for 1 h, followed by adding dropwise a solution of 0.4 g perfluoropentene (II; R = F) in THF, and the resulting mixture was allowed to react for 1 h to give 71.3% di(3-thienyl)perfluoropentene derivative II (R = Q) (III). A solution of III in benzene (2 + 10<sup>-2</sup> g/L) was irradiated by a 100 W-Hg lamp fitted with a glass filter for 60 min and turned colored to show maximum absorption ( $\lambda_{\text{max}}$ ) of 663 nm and mol. extinction coefficient ( $\epsilon$ ) of 14,700. The solution was irradiated by the Hg lamp fitted with a UV-cut filter at  $\geq 500$  nm and reversibly discolored. An optical disk comprising a polycarbonate disk coated with a recording layer (0.5  $\mu\text{m}$ ) consisting of a 1:1 mixture of III and polystyrene was irradiated by a 100 W black light for 20 min to color the entire recording surface and then by a semiconductor laser at 663 nm, 1,200 rpm, 1 MHz, laser intensity 7 mW, and 120° for recording. The disk was regenerated at the same rpm, laser intensity 0.2 mW, and  $\leq 40^\circ$ . The C/N ratio was 55 dB right after the first recording and 52 dB after 10 min of 12,000 times repeated recording-regeneration.

IT 168688-90-2P 168688-91-3P 168688-92-4P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)

(intermediate for preparation of di(aryl or heteroaryl)perfluorocycloalkene derivs. as photochromic substances and reversible optical recording media)

IT 168688-69-5P 168688-70-8P 168688-71-9P  
168688-72-0P 168688-73-1P 168688-74-2P  
168688-75-3P 168688-76-4P 168688-77-5P  
168688-78-6P 168688-79-7P 168688-80-0P

RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)

(preparation of di(aryl or heteroaryl)perfluorocycloalkene derivs. as photochromic substances and reversible optical recording media for optical recording and regeneration)

L16 ANSWER 33 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1993:614070 HCAPLUS

DOCUMENT NUMBER: 119:214070

TITLE: Photochromic diarylethene compounds for optical recording materials

INVENTOR(S): Tanaka, Kyoshi; Iwata, Osamu

PATENT ASSIGNEE(S): Central Glass Co Ltd, Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 5 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

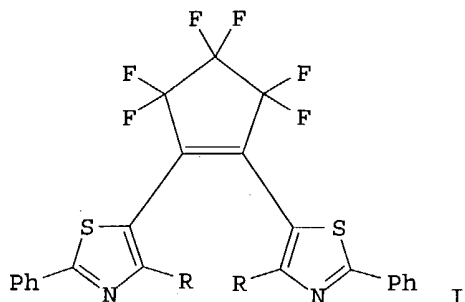
LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 05059025	A2	19930309	JP 1991-220269	19910830 <--
PRIORITY APPLN. INFO.:			JP 1991-220269	19910830
OTHER SOURCE(S):	MARPAT	119:214070		

GI



AB The diarylethene compds. have a general structure I (R = Me, CF<sub>3</sub>). The compds. have thermal stability and durability, and are useful as optical recording materials.

IT **141062-95-5P 141062-96-6P**

RL: PREP (Preparation)

(preparation of, photochromic, optical recording materials containing)

L16 ANSWER 34 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1992:174001 HCAPLUS

DOCUMENT NUMBER: 116:174001

TITLE: Preparation of fluorine-containing diarylethene derivatives

INVENTOR(S): Irie, Masahiro; Sayo, Koichi; Sumiya, Ritsuo; Horikawa, Yukio

PATENT ASSIGNEE(S): Kanebo, Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 4 pp.

CODEN: JKXXAF

DOCUMENT TYPE: **Patent**

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 03261762	A2	19911121	JP 1990-61745	19900313 <--
JP 2746452	B2	19980506		

PRIORITY APPLN. INFO.: JP 1990-61745 19900313

OTHER SOURCE(S): MARPAT 116:174001

GI For diagram(s), see printed CA Issue.

AB The title derivs. I (A, B = II, III; R<sub>1</sub>, R<sub>4</sub> = H, alkyl; R<sub>2</sub>, R<sub>3</sub> = H, alkyl, cyano; n = 2-5) having photochromic properties, useful for optical recording materials (no data), are prepared Thus, 2-cyano-1,5-dimethyl-4-iodopyrrole was stirred treated with hexane solution of BuLi in Et<sub>2</sub>O under stirring, then treated with perfluorocyclopentene to give 58% diarylethene IV showing reversible color change by UV irradiation

IT **139911-02-7P**

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)

(preparation and photochromic property of, for optical recording materials)

L16 ANSWER 35 OF 35 HCAPLUS COPYRIGHT 2004 ACS on STN

ACCESSION NUMBER: 1991:691259 HCAPLUS

DOCUMENT NUMBER: 115:291259

TITLE: Photochromic diarylethene compounds for optical recording materials

INVENTOR(S): Irie, Masahiro; Sumiya, Ritsuo; Sayo, Koichi;

Kabasawa, Makoto; Horikawa, Yukio

PATENT ASSIGNEE(S): Kanebo, Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 7 pp.

DOCUMENT TYPE: CODEN: JKXXAF  
LANGUAGE: Patent  
FAMILY ACC. NUM. COUNT: 1 Japanese  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 03135977	A2	19910610	JP 1990-61741	19900313 <--
JP 07179454	A2	19950718	JP 1994-293788	19941102 <--
JP 2650131	B2	19970903		

PRIORITY APPLN. INFO.: JP 1989-183959 19890717

OTHER SOURCE(S): MARPAT 115:291259

GI For diagram(s), see printed CA Issue.

AB Photochromic diarylethene compds. I (A, A1 = Q, Q1; R1-6 = H, aliphatic or alicyclic hydrocarbonyl, cyano; n = 2-5) are prepared I show good thermal stability in colored state, good durability, and high sensitivity. Thus, 3-bromo-2-methylbenzothiophene was lithiated by BuLi in Et2O and treated with perfluorocyclopentene to give 17% I (A = A1 = Q1, R3-6 = H, n = 3) (II) whose solution in THF colored by UV irradiation and decolored on irradiation with visible light. Poly(Me methacrylate) containing II showed good durability in repeated coloring-decoloring test.

IT 137814-08-5P 137814-09-6P 137832-71-4P

RL: PREP (Preparation)  
(preparation of, photochromic)

=> select rn 115 1-35  
E149 THROUGH E518 ASSIGNED

=>